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Safety Standards for Underground Coal Mine Ventilation; Rule

DEPARTMENT OF LABOR

Mine Safety and Health Administration

30 CFR Parts 70 and 75

RIN 1219-AA11

Safety Standards for Underground Coal Mine Ventilation

AGENCY: Mine Safety and Health Administration, Labor.

ACTION: Final rule.

SUMMARY: This final rule revises the Mine Safety and Health Administration's (MSHA) existing safety standards for ventilation of underground coal mines. The revisions update existing provisions consistent with advances in mining technology, eliminate duplicative and unnecessary standards, and reduce paperwork requirements, where possible.

EFFECTIVE DATE: August 16, 1992. Paragraph (g) of § 75.370 expires August 16, 1993.

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SUPPLEMENTARY INFORMATION:

I. Background

This final rule revises MSHA's existing safety standards for ventilation of underground coal mines in accordance with section 101 of the Federal Mine Safety and Health Act of 1977, (Mine Act) (30 U.S.C. 811).

On November 19, 1985, MSHA published a notice in the Federal Register announcing the availability of a preproposal draft of revisions to the existing ventilation standards. In response, MSHA received written comments regarding its preproposal draft from all segments of the coal mining community. After reviewing the comments on the preproposal draft, MSHA published a proposed rule in the Federal Register (53 FR 2382) on January 27, 1988. On May 12, 1988, MSHA published a notice outlining major issues raised by commenters and scheduling public hearings (53 FR 16872). The Agency held public hearings on June 6, 1988, in Pittsburgh, Pennsylvania; June 7, 1988, in Lexington, Kentucky; June 9, 1988, in Birmingham, Alabama; June 16, 1988, in Evansville, Indiana; June 20, 1988, in Grand Junction, Colorado; and June 22, 1988, in Charleston, West Virginia. All six public hearings were well attended. Transcripts of the proceedings were made available for public inspection. Following the public hearings, interested persons were allowed to submit supplementary statements and data until the record closed on September 2, 1988.

In March 1989, the Assistant Secretary of Labor for Mine Safety and Health directed that a special study be conducted to review safety questions surrounding the ventilation of belt conveyor entries in underground coal mines. In particular, the Assistant Secretary requested a thorough review of safety factors in the use of belt entry air at the working face, a practice followed at over 80 underground coal mines in the United States. On August 25, 1989, MSHA announced in the Federal Register (54 FR 35356) the availability of the Belt Entry Ventilation Report and reopened the rulemaking record for comment on relevant issues. In comments on the report, the Agency received a request for a public hearing on the issues raised as they related to the ventilation rulemaking. MSHA granted the request and held the hearing on April 18, 1990, in Reston, Virginia. The rulemaking record subsequently closed on May 18, 1990.

During this rulemaking process, MSHA received written and oral statements from all segments of the mining community. The Agency's final rule addresses the comments received and is consistent with the goals of Executive Order 12291, the Regulatory Flexibility Act, the Paperwork Reduction Act and the Mine Act.

II. Discussion of Final Rule

A. General Discussion

Underground coal mine ventilation affects various aspects of the safety and health of miners. Proper underground coal mine ventilation is necessary to protect against mine fires and explosions due in part to the presence of explosive gases in underground coal mines; oxygen-deficient atmospheres; and accumulations of other harmful gases. Ventilation is also a primary method of controlling miners' exposure to respirable dust and preventing the development of pneumoconiosis (black lung).

The final rule revises the existing standards for coal mine ventilation in 30 CFR part 75 which were promulgated over 20 years ago. In developing the rule, the Agency reviewed each revision and deletion to provisions contained in existing standards as well as each new provision in the final rule to ensure that the level of protection provided miners by existing standards is not reduced. In accordance with section 101(a)(9) of the Mine Act, the standards in the final rule do not reduce the level of protection afforded miners by the existing rules. In many cases, protection of miners' safety and health is enhanced by these revisions. For example, new standards that encourage the use of advances in ventilation technology and revised standards that upgrade the quality of examinations for hazardous conditions that are conducted in all mines improve protection for miners. In addition, the final rule eliminates unnecessary standards and, where appropriate, reduces paperwork requirements and reporting burdens.

The final rule establishes revised standards for ventilation that apply to all underground coal mines, while retaining requirements for each underground mine to have a ventilation system and methane and dust control plan (ventilation plan). The ventilation plan specifies precautions and practices applicable to the particular conditions at the mine. Some revisions in the final rule replace existing criteria used for the approval of ventilation plans with mandatory standards. As a result, approved ventilation plans will contain only ventilation control measures needed to address specific conditions at a mine.

The final rule does not include proposed provisions that would have allowed mine operators to use air coursed through belt conveyor haulageways to provide additional ventilation to working places. MSHA's existing standards do not allow this practice except as approved on a mine specific basis through the petition for modification process or when approved by the MSHA district manager for mines opened prior to March 30, 1970. The Agency has reviewed the record on this matter, including the results of the 1989 Belt Entry Ventilation Report and the comments received during and following the public hearing on the report, and has decided to refer this issue to an advisory committee under the provisions of the Mine Act. The final rule therefore retains the requirements of the existing 30 CFR 75.326.

The final rule provides for the voluntary use of atmospheric monitoring systems (AMS). An AMS may be used to monitor the mine atmosphere at specified locations for concentrations of methane, carbon monoxide, smoke, oxygen, and for air velocity. To encourage the use of this emerging technology, the final rule permits an AMS to be used as an alternative to certain air measurements and tests otherwise required to be made by persons during on-shift and weekly examinations of the mine. When so used, the AMS must meet the design and performance requirements in the final rule.

The final rule clarifies the scope of examinations for hazardous conditions, particularly the preshift examination conducted before the start of each shift. The final rule specifies that all areas of the mine where miners are scheduled to work or travel during the shift must be preshift-examined. If miners are sent to perform duties in areas where no preshift examination has been made for that shift, the rule requires a supplemental examination by a certified person within three hours before miners enter such areas.

In response to a commenter, the final rule does not retain the proposed provision, § 75.365, that would have permitted the use of an AMS to evaluate return air courses under specific conditions. The commenter disagreed with the use of an AMS to replace the physical examination of these air courses by a certified person indicating that the AMS could not examine for all hazardous conditions which might be discovered during a physical examination. Another commenter suggested that the use of an AMS should be permitted for all return air courses without restriction. MSHA has considered all comments relative to this issue and has deleted proposed § 75.365 from the final rule. The Agency agrees that although an AMS would be capable of providing information relative to the status of the ventilation in a return air course, current technology does not permit the AMS to warn the operator of all potential problems that a physical examination may discover.

The final rule incorporates recommendations contained in the Agency's June 12, 1985, report, "Two-Entry Longwall Mining—A Technical Evaluation." This report presented the results of studies of commonly employed practices and equipment used in longwall mining and the effects of these practices and equipment on miner safety in a two-entry longwall system. The report contained 35 recommendations directed at safe operation of two-entry systems. Following release of the report, on July 18, 1985, MSHA held a meeting in Denver, Colorado, to brief the public. At that meeting and in subsequent responses to the report, members of the mining community suggested that MSHA include the recommendations in the appropriate coal mine safety standards under review to provide an opportunity for public comment in the rulemaking process. Consistent with these suggestions, the proposed rule included recommendations from the report related to ventilation that the Agency considers to be applicable to all mines. These provisions are retained in the final rule. Among them are requirements for the construction and use of stoppings and other ventilation controls in all mines, and requirements for a travelway to be provided on the tailgate side of all longwall and shortwall panels. Under the final rule, if this travelway becomes blocked by a roof fall or other disturbance, mining must cease and miners must be withdrawn from face areas, MSHA must be notified, and work may resume on the longwall or shortwall face after implementation of the requirements contained in the roof control plan. Also related to longwall mining, the final rule includes a new provision that specifies a minimum air quantity at the intake end of each longwall face and requires a minimum air quantity to be provided during the installation and removal of longwall mining equipment to be specified in the approved ventilation plan.

The requirements for escapeways for underground coal mines in existing subpart R of 30 CFR part 75 are revised and transferred to subpart D. The proposed rule would have required new mines and new development areas of existing mines to have two escapeways ventilated with intake air from each working section. However, this provision has also been referred to and will be considered by the advisory committee. The final rule requires the operator to designate one of the two required escapeways as the primary escapeway and requires that this escapeway be ventilated with intake air and be generally free of fire sources.

Related to this issue, the final rule establishes new specific requirements for compressors in underground coal mines. MSHA determined that a compressor caused the 1984 Wilberg Mine fire in which 27 miners were killed. The final rule requires compressors to be located in noncombustible structures or areas and equipped with a heat-activated fire suppression system. Compressors must also be attended while operated, or be ventilated by intake air coursed directly into a return air course, and the noncombustible structures or areas in which the compressors are installed must be equipped with automatic closing doors activated by heat and carbon monoxide or smoke. Like most diesel equipment and electrical installations, compressors are not permitted in the primary escapeway in areas developed after the effective date of the rule.

The final rule also revises requirements for drilling boreholes in advance of mining and establishes procedures for mining into areas that have been penetrated by a borehole. Accidental mining into an inaccessible area can cause disruption of ventilation and expose miners to hazards such as methane accumulations, oxygen-deficient atmospheres, or inundation by water or gas.

Several provisions in the final rule require specific hazard records or examination results to be maintained for one year after the last entry in the record. These provisions are: paragraph (g) of § 75.312 main mine fan examinations and records; paragraph (h) of § 75.351 atmospheric monitoring system (AMS); paragraph (h) of § 75.360 preshift examination; paragraph (g) of § 75.362 on-shift examination; and paragraph (h) of § 75.364 weekly examination. The records are necessary as a control to enable the mine operator and MSHA to determine that the examinations are taking place and that hazards are addressed. They are also essential to the Agency as a tool for investigating the cause of mine accidents and fatalities, enabling the investigators to reconstruct the cause of the accident or fatality.

Each of these record keeping provisions require that records be entered "in a book maintained for that purpose." The existing rule requires the records to be kept in specified books that follow a certain format, including having a specific title. The final rule deletes §§ 75.1801 through 75.1805 of Subpart S of Title 30 of the Code of Federal Regulations, the sections that require records to be kept in specified books. Since the Agency is concerned with maintaining the appropriate safety information in a written record and not with the specific form or title of the record, a single format is not necessary. It is the Agency's judgment that keeping records "in books maintained for that purpose" allows mine operators greater flexibility to tailor the format of the books to State laws and also to meet their own specific needs without reducing safety.

Finally, the final rule revises § 75.2 by alphabetizing the definitions and putting the section into a format consistent with recent changes to other definition sections in the Code of Federal Regulations. The definitions for anthracite and volatile ratio are combined as are the two definitions for permissible.

B. Section-by-Section Discussion

Section 75.300 Scope

This subpart D sets forth requirements for underground coal mine ventilation.

Section 75.301 Definitions

The final rule defines "worked-out area" as an area where mining has been completed, whether pillared or nonpillared. This term excludes developing entries, return air courses, and intake air courses.

Commenters suggested that the final rule should clarify that worked-out areas do not include any active workings in the mine. The final rule, however, retains the existing definition of active workings in § 75.2(g)(4), which states that any place in a coal mine where miners are normally required to work or travel is considered to be active workings. Thus, under the final rule, worked-out areas that are traveled each week for purposes of the weekly examination required by § 75.364 are "active workings."

The final rule does not retain the proposed definition for "permanent electrical equipment." Under the proposal, all electrical equipment would have been included within the definition, except for communication and monitoring systems, self-propelled electrical equipment, and electrical equipment that is energized and operated only while attended. Under the final rule, this definition is unnecessary since §§ 75.340 and 75.380 do not retain the term "permanent electrical equipment." Instead, the final rule adopts the approach of existing § 75.1105 and specifically lists the types of equipment to which the rule applies.

Other new definitions in the final rule are for "air course," "intake air," and "return air." An "air course" is defined as a set of entries separated from other entries by ventilation control devices, such as stoppings, so that the mixture of air currents between each entry or set of entries is limited to the minimal leakage that occurs through the ventilation controls. For purposes of the examination required by § 75.364 of this subpart, the proposal would have expanded the definition of air course to include two adjacent entries or sets of entries with an open crosscut or crosscuts between them if the distance between open crosscuts is greater than 600 feet. Commenters objected to the proposed definition of air course, indicating that the definition requires air courses in the mine that are common at both ends to be examined separately. Also, a commenter noted that since they must be examined separately, each air course must be maintained safe for travel. The Agency has reconsidered this issue and the final rule does not include that part of the definition addressing entries which are common at both ends.

MSHA believes that air courses that are not common should be examined separately and has defined air course to achieve this purpose. The Agency does not consider air courses that are common only at each end to be the same air course if the separation between the common openings is more than 600 feet. Weekly examination of all such separate air courses is necessary to ensure that the ventilation system of the mine is functioning properly. Therefore, as suggested by a commenter, the final rule requires at least one entry of each intake air course to be traveled in its entirety. Similarly, at least one entry of each return air course must be traveled in its entirety.

The final rule adds definitions for "intake air" and "return air" to characterize the air current by whether the air has ventilated a working place or a mined-out area. Thus, intake air is defined as air coursed through a mine which has not yet ventilated the last working place on any split of any working section, or any worked-out area, whether pillared or non-pillared. If the air has ventilated these areas, it is considered to be return air. These definitions conform to established distinctions made throughout the mining industry. A commenter objected to the definitions of intake and return air, indicating that the definitions would prohibit air ventilating worked-out areas to be used to ventilate active workings elsewhere. The rule does not prevent active workings from being ventilated with return air. The rule specifies which areas must be ventilated with intake air. For example, § 75.332 prohibits air to be used to ventilate working places if it has passed through any area that is not examined according to §§ 75.360, 75.361 or 75.364 of subpart D, or if second mining has been done. Further, under § 75.332, air that has passed by an opening of any unsealed area that is not examined according to subpart D may not be used to ventilate a working place. The definition of return air also makes clear that if intake air mixes with air that has ventilated working places or worked-out areas, it is considered return air.

Consistent with current industry practice and Agency interpretation, for the purposes of existing § 75.507–1, MSHA considers air that has been used to ventilate any working place in a coal producing section or pillared area or air that has been used to ventilate any working face if this air is directed away from the immediate return to be return air whether or not it has ventilated the last working place on any split of any working section. Section 75.507–1, which addresses power connection points has not changed by this rule.

The final rule adds definitions for "incombustible," "noncombustible structure or area" and, "noncombustible material" to clarify provisions contained in the proposal and adopts the definition of "intrinsically safe" found in existing § 18.2. Incombustible is defined as incapable of being burned and is used in relation to main mine fan housings, air ducts used to connect fans to the mine, housings for internal combustion engines used to power main mine fans, and automatic closing doors on main mine fans. Because failure of these components affects the ventilation of the entire mine, it is important that they not be susceptible to fire. The term noncombustible structure or area is used to define a structure or area that will continue to provide protection against flame spread for at least one hour when subject to a fire test incorporating an ASTM E119–88 time/temperature heat input, or equivalent. These structures or areas contain equipment that increase the likelihood of fire in the structure or area. Requiring that a fire be contained in the structure or area for one hour, gives the opportunity for persons to escape or use direct fire fighting techniques.

Similarly, noncombustible material is used to describe a material that when used to construct a ventilation control results in a control that will continue to serve its intended function when subject to a fire test incorporating an ASTM E119–88 time/temperature input, or equivalent. The one-hour requirement for a ventilation control provides a time during which miners can escape before fire travels from one entry or air course to another.

The definition of intrinsically safe that is widely accepted throughout the industry has been adopted for use in this subpart. This definition is the same as that found in existing 30 CFR 18.2 and is used in relation to AMS that remain energized when power must be removed from electrically operated equipment or that is used in areas where permissible equipment is required.

Section 75.302 Main Mine Fans

The final rule revises and clarifies existing § 75.300 and requires underground coal mines to be ventilated by one or more main mine fans. The existing standard requires mines to be ventilated by mechanical ventilation equipment. In all cases, main mine fans provide the means by which mechanically produced pressure is supplied to the underground ventilating current.

The final rule does not permit the use of underground booster fans to assist main mine fans in bituminous and lignite mines. This is consistent with MSHA's application of existing fan installation approval criteria and recognizes established industry practice.

Commenters objected to prohibiting the use of booster fans underground. These commenters recommended that MSHA district managers be given authority to approve the installation of booster fans and that specific criteria be developed to address the use of this equipment. Some commenters stated that with advances in monitoring system technology, booster fans can now be safely operated in underground bituminous mines. Other commenters, however, agreed with the proposal and indicated that booster fans should not be used.

MSHA continues to believe that underground booster fans should not be generally permitted in bituminous and lignite mines. Among the safety concerns raised by the use of booster fans is a reduced ability to control recirculation of air underground. Also, if a mine fire or explosion occurs, the underground fan could be damaged, limiting the ability to restore ventilation to an area. Similarly, if it is necessary to remove electricity from an area, ventilation could also be interrupted. In addition, a fire or explosion could create a situation in which it is not possible to travel underground to control the booster fan to adjust ventilation in an area of the mine. A commenter stated that other potential hazards that may result from the use of such equipment are increases in levels of noise, as well as respirable and float coal dust. The commenter also stated that a mine could develop such a reliance on the use of the booster fan that the operator would not be aware of the impact on overall mine ventilation when the fan is not operating.

Unlike in bituminous mines, booster fans are currently used in anthracite mines to provide necessary ventilation to working areas. Due to the unique mining conditions found, and practices used in anthracite mines, ventilation of many anthracite mines would not be possible without the use of underground fans. Most anthracite mines are steeply pitching, with many cracks in the overlying strata that increase the difficulty of ventilating the mine. Also, most anthracite mines can develop only a limited number of entries. The final rule therefore continues to allow fans to be installed in anthracite mines in the main air current or a split of the main air current to increase air flow as specified in the approved ventilation plan.

The final rule eliminates the requirement that mechanical ventilation equipment be installed and operated in a manner approved by the Secretary. A commenter objected to this approach, stating that to ensure safe installation and use of the fans, MSHA's district managers should approve all installations. The commenter suggested retaining the existing approach that requires the operator to submit a plan for fan installation and operation. However, the plan approval criteria in the existing standards for installation and operation of main mine fans are included in §§ 75.310 and 75.311 of the final rule and apply to all mines.

Section 75.310 Installation of Main Mine Fans

This section addresses the installation of main mine fans and is derived primarily from the existing criteria in § 75.300–2 for the approval of main fan installation. Generally, the requirements of the final rule are aimed at the protection of main fans from fires and damage in the event of an underground explosion so that necessary ventilation can be maintained.

Paragraph (a) sets out the basic requirements derived from the plan approval criteria in existing § 75.300 that MSHA considers to be necessary for the safe installation of all main mine fans. Since the final rule applies to all mines, specified requirements do not need to be addressed in the approved ventilation plan for the mine, except in two situations: (1) The use of a pressure measuring device instead of a pressure recording instrument when main mine fans are permitted to be shut down according to § 75.311 and (2) alternatives to the required 15-foot offset of the fan.

The final rule requires each fan to be equipped with a device for recording fan pressure. These devices, which are also required under existing criteria, enable development of a profile of the mine's ventilation system, and facilitate detection of day-to-day changes in ventilating pressure such as might be caused by a roof fall or other occurrence in the mine that affects ventilation. Also, variations in fan pressure may lead to early detection of possible fan failure.

The final rule permits the use of main fan monitoring systems instead of pressure recording devices, if the systems can record mine ventilating pressure. This provision encourages the use of improved technology for monitoring main mine fans and does not reduce the protection afforded miners by the existing rule.

As discussed more fully below regarding § 75.312, mine operators using a main fan monitoring system may examine main mine fans weekly, rather than daily. If used in conjunction with a weekly fan examination, fan monitoring systems must perform certain functions listed in paragraph (c) in addition to recording mine ventilating pressure. Although one commenter objected to the use of main mine fan monitoring systems in lieu of the daily examination, the Agency feels that the use of these monitoring systems enhances the protection to miners provided by the daily fan examination because the monitor operates continuously. Paragraph (c) also specifies that monitoring systems must be capable of giving a signal to a surface location at the mine when a deficiency exists in the monitoring system or when the fan experiences a sudden increase or loss of mine ventilating pressure. Minor fluctuations in fan operating pressure are normal; however, sudden changes in main mine fan ventilating pressure can be indications of changes in fan operation or changes underground, such as roof falls or loss of ventilation controls. When these changes are greater than the normal fluctuations associated with the operation of an individual main mine fan, the fan monitoring system should give the signal required by paragraph (c).

This requirement also provides an effective alternative to daily fan examinations without reducing the protection provided miners by the existing rule. Paragraph (c) requires monitoring systems to be capable of monitoring main mine fans and their associated components for proper operation. MSHA requested comments in the proposal on whether this function should include monitoring the fan's bearing temperature, revolutions per minute, and vibration, as well as voltage and current. The Agency agrees with the commenters who indicated that the final rule should more specifically set out the requirements for fan monitoring. Accordingly, the final rule requires monitoring systems to be capable of performing these functions.

In addition to permitting fan monitoring systems to be used as a means of recording fan pressure, the final rule permits the use of other devices for measuring fan pressure, under certain circumstances. This exception is for mines permitted to shut down main mine fans as approved in the ventilation plan. As explained more fully in the discussion of that section, this provision provides a compliance alternative for small mines that

normally operate only one shift a day and do not have large sealed or unsealed worked-out areas. For these mines, the final rule allows the use of a pressure measuring device if the use of the device is approved in the mine's ventilation plan.

The use of pressure measuring devices, often called "U-tubes," has been permitted under the existing criteria. The final rule allows U-tubes and similar devices to be used only at mines where continuous recording of fan pressure does not achieve substantial safety benefits. At these mines, pressure recorders would register a fan pressure of zero during the portion of each day that the fans are permitted to shut down. To achieve the same level of protection at these mines when the fans operate and a fan pressure measuring device is used, § 75.312 requires a record to be made of the fan pressure immediately before the fan is stopped and after the fan is restarted and the fan pressure stabilizes. This aspect of the final rule is discussed more fully in the explanation of § 75.312.

Section 75.310 retains existing provisions designed to protect fans from fires and requires each main mine fan to be installed on the surface in an incombustible housing and be connected to the mine opening with an incombustible air duct. Like the existing rule, the final rule also requires each fan to be equipped with an automatic device that gives a signal that can be seen or heard when the fan either slows or stops. In response to a commenter, the final rule clarifies that this signal must be given so that it can be seen or heard at all times by a responsible person who is always on duty when persons are underground. Section 75.313 addresses procedures to be followed during unintentional fan stoppages. Also, § 75.311(d) requires any unusual variance in the mine ventilating pressure, such as when the main fan slows, to be investigated immediately.

To minimize the potential for fans to be damaged or destroyed by the forces of an explosion underground, paragraph (a)(5) also requires fans to be protected by one or more weak walls or explosion doors, or a combination of weak walls and explosion doors. Retained from the existing criteria, this provision is designed to prevent the forces of an explosion from reaching a main mine fan. Specific requirements for weak walls and explosion doors are included in paragraph (d) discussed below.

Paragraph (a)(6) also requires fans to be offset at least 15 feet from the nearest side of the mine opening to protect them if an explosion occurs underground. Retained from the existing fan installation criteria, this provision ensures that the main fan is not in direct line with possible explosive forces escaping the mine. Under the existing criteria, however, MSHA has approved fan installations providing an offset of less than 15 feet. Generally, these installations have been at mines where the location of the fan opening does not allow an offset of 15 feet. To provide the same compliance flexibility as the existing criteria, and without reducing the protection provided miners, the final rule does not require an offset of 15 feet to be provided if the fan is installed in a diversion entry as described in paragraph (e) or if alternative methods of protecting the fan and its associated components are specified in the mine's approved ventilation plan.

Paragraph (b) retains the existing plan approval criteria for fans driven by electric motors and by internal combustion engines. It requires that electric motors operate from a power circuit independent of all other mine power circuits. This enables main fans to continue operating and maintain ventilation should underground electric power be interrupted.

For fans driven by internal combustion engines, paragraph (b)(2) requires the engine's fuel supply to be protected against fires and explosions. This protection may include the use of fire suppression systems or locating the fuel supply away from ignition sources and combustible material. Paragraph (b)(2) also requires the engine to be installed in an incombustible housing, and the engine and engine exhaust system to be located out of direct line of the air current exhausting from the mine. The engine exhaust also must be vented to the atmosphere so that the exhaust gases do not contaminate the mine intake air current or any enclosure. These provisions are retained from the existing approval criteria and minimize the potential for fires in and around the fan installation and reduce the potential for contamination of the intake air for the mine.

A new provision applicable to fans driven by internal combustion engines requires that the engines be equipped with remote shut-down switches. Unlike an electric motor, which can be stopped by cutting electric power, an internal combustion engine will continue driving a fan as long as the fuel supply to the engine lasts. Thus, if the engine is inaccessible and cannot be remotely shut down in the event of a mine fire or a similar emergency, the fan will continue to supply air to the fire as happened during the Wilberg Mine fire in 1984.

The final rule includes requirements for weak walls and explosion doors. Paragraph (a)(5) requires weak walls or explosion doors for the protection of main mine fans from explosive forces originating from underground areas. Paragraph (d) requires weak walls and explosion doors to have a cross-sectional area at least equal to that of the entry through which the pressure from an explosion underground would be relieved. MSHA intends that this provision prevent explosive forces from being routed to and possibly damaging main mine fans. The final rule allows the use of combinations of explosion doors and weak walls designed to protect main mine fans, thus providing compliance flexibility and encouraging the use of the safest and most efficient methods of main mine fan protection at each mine.

Paragraphs (e) and (f) establish requirements derived from existing plan approval criteria for specific main fan installation situations. Paragraph (e) addresses fans installed in line with a mine entry, a slope or a shaft, and requires that the cross-sectional area of the pressure relief entry be at least equal to that of the fan entry. In addition the fan entry must be developed out of direct line of possible explosive forces. At least 2,500 square feet of coal or other solid material must be between the pressure relief entry and the fan entry. Also, to increase the likelihood of explosive forces being diverted out of the mine away from fan openings, the final rule requires the surface opening of the pressure relief entry to be no less than 15 feet nor more than 100 feet from both the surface opening of the fan entry and from the underground intersection of the fan entry and the pressure relief entry. Together these precautions in paragraph (e) protect fans from the forces of an explosion underground and maximize the effectiveness of systems to divert explosive forces away from main mine fans.

For mines ventilated by multiple main mine fans, paragraph (f) requires that incombustible doors be installed so that if any main fan stops, the doors automatically will close to prevent air reversal through the fan. Pressure differentials created when a main fan stops and other fans keep running can cause air to be diverted away from working areas in the mine and may result in air reversals. However, MSHA recognizes that in mines ventilated by blowing fans, and in some mines ventilated with combination exhaust and blowing fan systems, air reversals may not be possible. In such circumstances, automatic closing doors

may not be needed. Accordingly, paragraph (f), like the existing criterion, does not apply to multiple fan systems where air reversal cannot occur. Where air reversals can occur, however, the final rule requires automatic closing doors to be installed.

Section 75.311 Main Mine Fan Operation

This provision is derived from existing plan approval criteria in §§ 75.300–2 and 75.300–3 and establishes requirements for main mine fan operation. It requires fans to be continuously operated to provide constant ventilation to underground areas and specifies precautions for planned fan stoppages. This provision also addresses the repair of main mine fans, monitoring of fan signal devices on the surface, and protection against fires around fans and intake air openings.

Paragraph (a) of § 75.311 permits main mine fans to be stopped as specified in the approved ventilation plan for the mine or when intentionally stopped for testing of automatic closing doors and automatic fan signal devices or for maintenance or adjustment of the fan. In response to comments, which indicated that some necessary maintenance and repair work underground can be done only while the fan is stopped, the final rule also allows the fan to be stopped when necessary to perform maintenance or repair work underground that cannot otherwise be done while the fan is operating.

To minimize hazards to miners during planned main fan stoppages, the final rule sets several requirements that must be followed when the fan is stopped. Under proposed § 75.311, these requirements would have applied when the fan is stopped and the required ventilation is not maintained. Testimony at public hearings showed confusion about this provision as proposed, and at the hearings MSHA clarified its intent that if a main fan is stopped, all of the ventilation provided by that fan must be provided by a back-up fan system. Otherwise the provisions of § 75.311 would apply. Accordingly, the final rule states that the specified precautions must be taken when a fan is stopped and the ventilating quantity provided by the fan is not maintained by a back-up fan system. Paragraph (c) provides compliance flexibility when a back-up fan system does not provide the total ventilating quantity provided by the main mine fan. This provision, which is intended to allow necessary mine maintenance activities such as pumping when the fan is stopped, allows persons to enter the mine and electric power circuits to be energized as specified in the approved ventilation plan. This aspect of the final rule does not reduce the protection provided miners by the existing rule, since it applies only if sufficient ventilation is provided by a back-up fan system to permit specific activities to be safely conducted in the mine.

Except in the limited circumstances described in paragraph (c), if the ventilating quantity of the fan is not maintained during a planned fan stoppage, only certain persons are permitted in the mine. These include persons necessary to evaluate the effect of the fan stoppage or restart, or to do maintenance or repair work that cannot otherwise be done while the fan is operating.

The proposed rule would have required electric power circuits entering underground areas to be deenergized only when the planned stoppage lasted for longer than 30 minutes. A commenter expressed concern that this approach could increase the likelihood of explosions. After consideration of the comments, MSHA has not included the proposed provision in the final rule. Instead, for any fan stoppage other than those addressed in the approved ventilation plan under paragraph (c), paragraph (b) requires mechanized equipment to be shut off before the fan is stopped and underground electric power circuits to be deenergized during the fan stoppage. This minimizes the risk of an explosion underground during any planned period when the mine will not be ventilated.

When a back-up fan system is used that does not provide the ventilating quantity provided by the main mine fan, paragraph (c) permits persons to be in the mine and power circuits to remain energized. The persons who will be in the mine, the work these persons will be doing, and the power circuits that will remain energized must be specified and approved in the mine's ventilation plan.

Paragraph (d) requires prompt repair of any electrical or mechanical deficiency in a main mine fan. A deficiency in a main mine fan can result in inadequate ventilation of underground areas, endangering miners. A commenter indicated that unless the final rule requires such deficiencies to be reported to the person in charge of the mine's operation, the rule would eliminate the accountability of the operator for fan deficiencies. The final rule retains the proposed language. The mine operator is ultimately responsible for all safety and health matters involving the mine, and under the final rule, the operator is accountable for the failure to correct any fan deficiency.

Paragraph (d) also requires any unusual change in the mine ventilating pressure to be investigated immediately. Changes in ventilating pressure may be discovered during the fan examination required by § 75.312, when a fan signal device is activated by a fan slowdown, or on other occasions when the mine operator checks the mine ventilating pressure when the fan is examined. This aspect of the final rule also achieves the same level of protection as the existing rule, which requires "appropriate action" to be "instituted promptly" when an unusual change in ventilating pressure occurs. Minor fluctuations in fan operating pressure are normal; however, unusual changes can be indications of changes in fan operation or changes underground, such as roof falls or loss of ventilation controls. When these changes are greater than the normal fluctuations associated with the operation of an individual main mine fan, they should be investigated immediately.

Paragraph (e) requires that while persons are underground a responsible person designated by the operator must be at a surface location where the mine fan signal can be seen or heard. This provision allows immediate warning to be given to miners underground if a fan malfunctions or any other hazard exists that may require miners to be withdrawn to the surface or other precautions to be taken.

Paragraph (f) prohibits accumulation of combustible and flammable material in the area surrounding each main mine fan and intake air opening. Liquid fuels and other flammable substances stored on the surface, as well as debris that can burn in the area of mine fans, present the hazard of mine ventilation systems becoming contaminated by smoke from a fire on the surface. Therefore, the final rule retains the proposed requirement that this provision apply to the area within 100 feet of all surface fans and mine openings. Paragraph (f), however, like the existing criterion, allows alternative protective measures to be included in the mine's approved ventilation plan. This provision is intended to provide compliance flexibility without reducing the protection provided miners by the existing rule by recognizing that other effective precautions may be taken to provide protection from fire and products of combustion where a clear area of 100 feet is not available.

Paragraph (g) retains, with clarifying changes, the existing provision in § 75.300–3 addressing multiple main fans. The final rule requires the mine ventilation system to be designed and

maintained to eliminate areas without air movement. Unless the ventilation system of the mine is carefully planned and maintained in a multiple fan situation, unventilated areas can be created underground by pressure equalization between main fans.

The final rule does not retain the existing language specifying that airflow should be maintained in all intake and return air courses. Since the final rule specifies minimum air quantity requirements in § 75.325, as well as requires air velocity measurements to be made at specified locations during the preshift, on-shift, and weekly examinations, airflow must be maintained at all times.

In response to comments, the final rule allows AMS that are intrinsically safe to be operated during fan stoppages.

Section 75.312 Main Mine Fan Examinations and Records

This standard is derived from the existing § 75.300–4, which requires main fans to be inspected daily. Proper operation of main mine fans is critical to mine ventilation. Therefore, the final rule, like the existing standard, requires main mine fans and associated components, including devices used to measure and record pressure, to be examined at least once each day that the fan operates.

As an alternative to a daily examination of the main mine fan, paragraph (b) permits a weekly fan examination if a main mine fan monitoring system is used and is fully functioning. MSHA believes that main fan monitoring systems represent improved technology with the potential to provide greater safety. The final rule requires the main fan monitoring system to supply at least as much information regarding fan performance as the daily examination. As discussed above, the monitoring system must be capable of recording mine ventilating pressure and of monitoring bearing temperature, revolutions per minute, vibration, voltage, and amperage. Unlike the information resulting from the daily examination, the monitoring system provides a continuous profile of fan performance.

If a monitoring system is used, the weekly examination required by the final rule provides additional verification of proper fan performance. Also, this examination must include a test of the monitoring system to ensure that it is operating properly. If the monitoring system malfunctions at any time, paragraph (b) requires the monitoring system to be repaired or requires the affected fan to be examined at least once each day during which the fan operates until the problem has been corrected.

Paragraph (c) is a new requirement that addresses testing automatic fan signal devices. The rule requires that at least every 31 days, the automatic fan signal device for each mine fan be tested by stopping the fan. Commenters on the preproposal draft indicated that stopping the fan to test the automatic signal device would put undue stress on the fan. The proposal therefore did not specify fan stoppage to test the signal device. The proposal did state, however, that requiring fan stoppage during signal testing was still being considered by the Agency because MSHA believed that the best test for a signal device is to stop the fan. Since then, MSHA has received assurance from fan manufacturers that stopping fans monthly to test the signal device will not cause undue stress to mine fans. The final rule therefore requires fan stoppage during signal testing. Also, paragraph (d) requires that at least once every 31 days, automatic closing doors in multiple main fan systems be tested by stopping the fan. In the event of a mine fan failure or stoppage, these doors must automatically close to prevent an air reversal through the fan. The Agency believes that, like fan signal devices the best way to ensure proper operation of an automatic closing door is to stop the fan. The Agency intends that the testing of the fan signal and the automatic closing doors can be done at the same time if the operator so chooses.

Paragraph (e) retains the proposed provision that requires that circular mine fan pressure recording charts be changed before the beginning of a second revolution.

Paragraph (f) requires the person performing the examination to certify by initials and date that an examination was made and note the main mine fan examined. Paragraph (g) retains the existing requirement to keep a record of fan examinations. However, unlike the existing standard, which requires a record of the results of every inspection, the final rule requires a record of all defects that may affect the operation of the fan that are not corrected by the end of the shift on which the fan examination is made. Deficiencies corrected by the end of the shift are not required to be recorded. Under § 75.311, all electrical or mechanical deficiencies in a main mine fan must be repaired promptly. Also, since the main purpose of this recordkeeping requirement is to alert miners on oncoming shifts of defects found during the fan examination that may affect their shifts, it serves no additional safety benefit to require a record to be made of deficiencies which are corrected by the end of the shift on which the examination is made. Paragraph (g) also retains the existing requirement to keep the record of fan examinations in a book maintained for that purpose.

A new recordkeeping requirement in the final rule addresses mines where fans are permitted to be shut down if approved in the ventilation plan and a pressure recording device is not used. As discussed above, mines permitted to shut down main mine fans under existing criteria often operate during only one working shift a day. At these mines, a pressure measuring device, such as a U-tube, may be used. No record of fan pressure, which would be zero while the fan is not operating, is provided by the U-tube. Therefore, the final rule requires a record of fan pressure to be made immediately before the fan is stopped, as well as after the fan is restarted and the fan pressure stabilizes. This record also must include the time of the pressure reading. If a mine chooses to operate the fan continuously, no record is required.

Paragraph (h) requires the records, including mine fan pressure recording charts, to be retained for at least one year and made available for inspection by authorized representatives of the Secretary and the representative of miners.

The final rule does not retain the existing provision specifying that the person conducting the examination must be trained by the operator. Training is now separately addressed by 30 CFR part 48, which did not exist when the current rule was issued.

Section 75.313 Main Mine Fan Stoppage With Persons Underground

This final rule is derived from existing § 75.321 and sets safety precautions for any unplanned main mine fan stoppage that interrupts ventilation while persons are underground. Unlike the existing standard which requires mine operators to develop a fan stoppage plan for withdrawal of persons and deenergization of equipment, the final rule establishes standard procedures to be followed during a main fan stoppage. It also requires certain precautions to be taken when stoppages last longer than 15 minutes. Since the provisions apply uniformly to all mines, MSHA has not retained the existing requirement for a fan stoppage plan approved by the district manager.

Paragraph (a) requires all electrically powered equipment in each working section to be deenergized if a main fan stops and the ventilating quantity

provided by the fan is not maintained by a back-up fan system. Deenergizing electrical equipment on working sections minimizes the possibility of an ignition source for accumulations of methane that can develop quickly when ventilation is interrupted. For the same reason, the final rule requires all other mechanized equipment in each working section to be shut off, including diesel-powered and battery-operated equipment. This precaution also minimizes potential ignition sources and prevents the accumulation of diesel exhaust contaminants while mine airflow is interrupted.

Paragraph (a)(3) also requires all persons to be withdrawn from working sections and areas where mechanized mining equipment is being installed or removed when ventilation is interrupted by a main mine fan stoppage. Areas where coal is being extracted or mechanized mining equipment is being installed or removed are typically the places in an underground mine where methane accumulation and other hazards to health or safety can develop quickly when ventilation is interrupted. To avoid exposure of miners to these hazards, timely withdrawal of persons is an important safety practice. Requiring withdrawal from the working section means that miners must be withdrawn out by the section loading point. In areas where equipment is being installed or removed and the loading point has not been established or has been removed, withdrawal is to be to the anticipated location of the loading point or to the last location of the loading point.

Paragraph (b) allows work to resume if ventilation is restored within 15 minutes after a main fan stops provided that certified persons first examine for the presence of methane in all working places and in areas where methane is likely to accumulate. A thorough examination is necessary so that methane ignitions do not occur when mining activity resumes. Diesel and electrically-powered equipment may be restarted in such areas only after certified persons have made examinations for methane in those areas.

Paragraph (c), derived from existing § 75.321, requires miners to be withdrawn from the mine when normal mine ventilation is not restored within 15 minutes after a main mine fan stops. It also requires all electric power circuits to be deenergized, except intrinsically safe AMS and circuits necessary to withdraw persons from the mine. Those circuits that remain energized for withdrawal of persons must be deenergized in an orderly manner as persons are withdrawn. Paragraph (c)(3) also requires that mechanized equipment not on the working section be shut off unless the equipment is necessary to withdraw persons from the mine.

A commenter indicated that the final rule should require withdrawal of miners after the fan has stopped for 5 minutes, instead of 15 minutes. The final rule does not include this recommendation. The final rule also does not include a recommendation by other commenters that time periods greater than 15 minutes should be permitted before withdrawal is begun. The Agency has found that 15 minutes is an appropriate time period to protect miners from the hazards that may develop following a fan stoppage. The 15-minute period is derived from existing § 75.321–1 which, with existing § 75.321, requires miners to be withdrawn from the mine after a fan stoppage in a "reasonable period" of not more than 15 minutes, unless the district manager approves a different period.

When ventilation is restored and before electric power circuits may be energized in any area, paragraph (d)(1) requires certified persons to examine underground areas and determine them to be safe before miners are permitted to return. This examination must include tests for methane and oxygen deficiency and verification that ventilation has been restored to required levels. These precautions protect miners from hazards that can develop in working places while ventilation is interrupted.

Paragraph (d)(2) is a new provision that reflects current industry practice. It permits miners to return to underground areas if ventilation is restored to the mine before they reach the surface if the underground areas where the miners work or travel are examined by certified persons and determined to be safe. MSHA does not intend that miners follow the certified persons during the examination. While the examination is being completed, miners may continue withdrawing to the surface or may wait underground. The miners must wait until the entire examination is completed before returning to their work areas. This provision preserves the level of protection provided miners by the existing rule, which does not specifically address situations in which the fan is restarted while persons are withdrawing. Existing § 75.321 states only that fan stoppage plans must "provide for withdrawal of all persons from the mine if ventilation cannot be restored" within a reasonable time.

Since the final rule allows the fan to be restarted to restore proper ventilation, it is not necessary for miners to continue withdrawal from the mine. The final rule adopts the approach of existing fan stoppage plans that permit miners to return to underground areas if ventilation is restored before they reach the surface provided an examination of the areas is made by certified persons and the areas are determined to be safe. In adopting this approach, MSHA has carefully considered written comments and testimony given at the public hearings that objected to the proposal. A major premise of the comments and testimony was that methane accumulations can be moved to an ignition source after ventilation is restored. One commenter indicated that miners should be withdrawn to the surface after all fan stoppages longer than the specified time period to minimize the possibility of miners being trapped underground or harmed by the forces of an explosion while they are waiting to return to working areas. One commenter argued that the fan should not be restarted while miners are enroute to the surface because methane may be pulled across potential ignition sources. Another commenter argued that the fan should be restarted as soon as possible to reestablish proper ventilation and remove the potential for methane accumulations. MSHA agrees that the fan should be restarted. The final rule addresses the other concerns by requiring that after a fan has been down for 15 minutes, underground electrical power circuits be deenergized and other mechanized equipment be shut off except personnel transportation equipment necessary to withdraw miners.

If a back-up fan system is used that does not provide the ventilating quantity provided by the main mine fan, § 75.311(c) permits persons to be in the mine and electric power circuits to be energized as specified in the approved ventilation plan. MSHA intends that when a back-up system is used and a fan stoppage occurs, these same persons may reenter the mine and the same power circuits may be energized as specified and approved in the ventilation plan. This permits necessary maintenance activities, such as pumping water, to be conducted until normal mine ventilation is restored. This does not mean that when a back-up fan is used that does not provide the same air quantity that the operator is exempted from the requirement to withdraw persons and deenergize or shut down equipment. Persons must be withdrawn and power must be deenergized, as required, and then the persons specified

in the approved ventilation plan may reenter the mine and electric circuits specified in the approved ventilation plan may be energized. The reason for requiring persons to be withdrawn and power circuits to be deenergized is that in most cases when a fan cannot be restarted within 15 minutes, the cause of the stoppage may not be known.

Also like § 75.311, paragraph (e) permits AMS that are intrinsically safe to remain energized during fan stoppages. Intrinsically safe systems will not cause ignitions during fan stoppages and, as indicated by commenters, could provide valuable information about the mine while ventilation is interrupted.

Section 75.320 Air Quality Detectors and Measurement Devices

The final rule revises and consolidates existing §§ 75.303, 75.303–2, 75.305–2, 75.306–1, 75.307–1, 75.308–2, 75.309–1, 75.310–2, 75.311–1, 75.312–2, 75.314–1, 75.315–1, and 75.317. It establishes requirements for devices used to make required tests or measurements, including tests for methane, oxygen deficiency, and air velocity.

Electric components of methane detectors and other devices can be an ignition source for methane and other explosive gases. Therefore, the final rule retains the requirement found in existing §§ 75.303, 75.305–2, 75.307–1, 75.308–2, 75.309–1, 75.310–2, 75.311–1, and 75.312–2, that methane detectors must be approved by MSHA. Additionally, paragraph (a) requires these devices to be maintained in permissible and proper operating condition, a provision derived from existing § 75.317. The final rule does not retain the requirement in existing § 75.317 that maintenance of methane detectors and other devices be done by a trained person. Under the final rule, methane detectors and other devices must be properly maintained at all times regardless of whether the person doing the maintenance has been trained by the operator. This does not preclude the operator from sending instruments out to the manufacturer or other repair facilities for regular servicing.

The final rule also does not require care to be taken before each shift to ensure that devices for detecting methane and oxygen are in permissible condition. As stated above, these devices always must be maintained. Also, existing § 75.150, which is unchanged by the final rule, requires persons who carry detecting devices underground to be qualified in their use. Consistent with the existing requirement, the final rule requires that tests for methane and oxygen deficiency be made by qualified persons.

MSHA indicated in the proposal that maintaining methane detectors and other devices in permissible and proper operating condition requires routine calibration with known methane-air mixtures. The Agency requested comments on whether a specific calibration interval should be included in the final rule. In response, commenters suggested retention of a specific calibration requirement, emphasizing the importance of a regular calibration schedule. The final rule specifies that methane detectors must be calibrated with a known methane-air mixture at least every 31 days. The final rule does not require weekly calibration, as recommended by a commenter. Manufacturers of methane detection instruments generally specify monthly calibration for their instruments. The Agency emphasizes, however, that the interval specified in the rule is a minimum calibration requirement. MSHA continues to believe that proper calibration is an essential part of maintaining the equipment in proper operating condition, and operators must calibrate instruments with sufficient frequency to maintain proper calibration at all times that the instruments are available for use underground.

Paragraph (b) contains a new provision that requires tests for oxygen deficiency to be made with MSHA-approved oxygen detectors. Such devices must be maintained in permissible and proper operating condition and must be capable of detecting 19.5 percent of oxygen. Also, the calibration of oxygen detectors must be checked at the start of each shift that the detectors will be used. Since normal air contains approximately 20.9 percent oxygen, the calibration of an oxygen detector can be confirmed by turning it on and verifying that its read-out shows 20.9 percent oxygen in air. Due to the ease with which this check can be made and because it is already an accepted safety practice in the industry, MSHA does not believe this requirement is burdensome. Paragraph (b) specifies that the check be made at the start of the shift on which it will be used to enable the check to be made underground. Because oxygen detectors can be affected by barometric pressure, the calibration of the detector should be checked at the approximate elevation at which it will be used.

Paragraph (c) applies to handheld devices that contain electrical components, such as those used to measure air velocity. Paragraph (c) also sets new requirements for devices with electrical components that detect carbon monoxide, oxides of nitrogen, and other gases. Like methane detectors and other electrically operated devices, this equipment must be approved for permissibility and maintained in permissible and proper operating condition. Also, as with methane detectors, MSHA believes that maintaining these detectors in permissible and proper operating condition includes routine calibration with known concentrations of the applicable gas. However, because calibration requirements may vary based on the type of instrument used, a specific calibration interval is not included in the final rule for these devices.

Several commenters objected to the proposal to prohibit flame safety lamps in underground mines. The commenters indicated that the devices are reliable, easy for miners to use and maintain, and are an accepted and traditional component of safe underground mining. Commenters also indicated that flame safety lamps can be a supplemental light source if the cap lamp fails and that many States require the use of such devices in performing tests for methane and oxygen deficiency. Most commenters recommended that the final rule permit flame safety lamps to be used as supplementary testing devices. MSHA believes that flame safety lamps cannot be used to accurately measure oxygen and methane at levels of 19.5 percent and 1.0 percent, respectively, as required by the final rule. Recognizing the problems associated with the large number of oxygen detectors that would be required, the final rule permits flame safety lamps to be used to test for oxygen deficiency for 3 years after which they may continue to be used as a supplementary testing device. As with other types of detectors, flame safety lamps must be approved and must be maintained in permissible operating condition at all times.

A commenter also noted that the proposal did not address the use of anemometers, devices used in mines to measure air velocity. The commenter requested MSHA to clarify whether the final rule prohibits the use of these devices. Under the final rule, like existing §§ 75.303–2 and 75.306–1, the operator may use any device capable of measuring air velocity, including a rotating vane anemometer. Where devices used to measure air velocity contain electrical components, the final rule, like the existing provisions, requires these devices to be approved for permissibility to ensure that they can be safely used underground.

Section 75.321 Air Quality

This standard is derived from existing §§ 75.301 and 75.301–5 and deletes existing §§ 75.301–6, 75.301–7 and 75.301–8. The rule establishes a basic air quality requirement that all areas where persons work or travel in an underground mine must be ventilated by air that contains at least 19.5 percent oxygen and not more than 0.5 percent carbon dioxide. In most workplaces, normal air contains about 20.9 percent oxygen and .03 percent carbon dioxide. Levels below 19.5 percent oxygen and above 0.5 percent carbon dioxide indicate that an air quality problem exists that needs attention. The final rule retains the levels in existing § 75.301 as appropriate for underground coal mines.

Paragraph (a) retains the requirement in existing § 75.301 that the volume and velocity of the air current in areas where persons work or travel be sufficient to dilute, render harmless, and carry away flammable, explosive, noxious, and harmful gases, dust, smoke and fumes. MSHA had proposed to delete this provision but now agrees with commenters to retain it. Achieving and maintaining proper airflow in all active areas of the mine is an important step in providing miners with a safe and healthy working environment. Also, this requirement is necessary to supplement the air volume and velocity requirements, set out elsewhere in the final rule, that address working sections and working places.

Paragraph (b), derived from existing § 75.301–5, establishes a maximum permissible level for explosive gases in air, other than methane. Like existing § 75.301–5, the maximum permissible concentrations specified for the gases addressed in the final rule are based upon the lower explosive limit of each gas. The lower explosive limit is the lowest concentration at which a gas will propagate and maintain an explosion. The maximum permissible levels are 20 percent of the lower explosive limits of the listed gases.

The proposal would have deleted the maximum permissible level for acetylene, propane and MAPP (methyl-acetylene-propylene-propodiene). A commenter objected to this deletion stating that all of these gases can occur underground and could accumulate to form explosive mixtures. The Agency agrees with the commenter and retains the existing standard relative to explosive gases, including carbon monoxide, which would have also been deleted by the proposal. The proposal would have also established a level for ethane. This gas can be found in underground coal mines, particularly near oil and gas wells. Section 75.323 requires precautions to reduce methane concentrations in underground coal mines, and the action levels set by that rule will ensure that ethane does not exceed a level that could endanger miners. When ethane is present, methane will be present in far greater concentrations. For example, because ethane is normally found at levels that are approximately 10 percent of the methane level present, an accumulation of ethane exceeding the proposed limit of 0.6 percent may mean a methane accumulation approaching 60 percent. Given the maximum permissible levels of methane specified in the final rule, the Agency finds that it is no longer necessary to include a maximum permissible level of ethane in coal mines.

As proposed, the final rule removes existing §§ 75.301–6 and 75.301–7. These standards specify actions to be taken by MSHA regarding sampling for explosive gases other than methane and the enforcement and abatement procedures to be applied in the event gas accumulations exceed the standards. The Act clearly delineates enforcement and abatement procedures for violations of standards and provides for a variety of inspection and investigation activities, including determining whether an imminent danger exists. MSHA believes that standards specifying MSHA-conducted sampling programs unnecessarily inhibit refinement and improvement in the administration of the Agency's responsibility. The final rule thus in no way limits MSHA when the Agency determines that sampling is necessary at a particular mine to check the levels of explosive gases and does not reduce the protection provided miners by the existing rule.

Also as proposed, the final rule does not retain existing § 75.301–8. The existing requirements specify measures an operator must take to control concentrations of explosive gases known by the operator to exist in the mine. Like the existing rule, the final rule contains maximum permissible limits of explosive gases other than methane, but allows operators to develop the method of maintaining compliance with these limits. Accordingly, the final rule does not reduce the level of protection provided miners by the existing standard.

Section 75.322 Harmful Quantities of Noxious Gases

The existing standard for harmful quantities of noxious gases at § 75.301–2 has been redesignated as § 75.322 but is otherwise unchanged. This standard includes an incorporation by reference of the threshold limit values (TLV's) adopted by the American Conference of Governmental Industrial Hygienists for harmful, noxious and poisonous gases which are more appropriately addressed in the Agency's health standards. On August 29, 1989, MSHA proposed comprehensive changes to this standard in a separate rulemaking (54 FR 35760). Appropriate exposure limits will be established by that rulemaking to address hazards at underground coal mines.

Section 75.323 Actions for Excessive Methane

The final rule revises and consolidates existing §§ 75.307, 75.308, 75.309, 75.310, and portions of § 75.316. It establishes action levels for methane concentrations detected in the areas of the mine that are most likely to immediately endanger miners. The existing rule had an action level of 1.0 percent methane in the face areas and section returns. The final rule has extended this 1.0 percent action level for methane to areas where mechanized mining equipment is being installed or removed and to intake air courses, including belt haulage entries. In addition, the final rule permits higher concentrations of methane in the section returns from a point opposite the location of the section loading point to where that split of air meets another split of air or is used to ventilate seals or worked-out areas provided certain safety precautions are taken. The maximum allowable methane concentration in the working faces and in the immediate return from the last working place on the section to a point in the return opposite the section loading point remains at less than 1.0 percent. Thus, the final rule does not reduce the level of protection provided by the existing rule.

When 1.0 percent or more methane is present in a working place, an intake air course, or an area where mechanized mining equipment is being installed or removed, paragraph (b)(1) requires all electrical, diesel, and battery-powered equipment in the affected working place, intake air course or other area, except for intrinsically safe AMS, to be deenergized or shut off. Deenergizing or shutting off this equipment prevents it from providing ignition sources. A commenter suggested that the final rule require that when 1.0 percent methane is present in a working place, the power be cut off at the source as in the existing rule. The existing rule requires at 1.0 percent methane power be cut off but

does not require that it be cut off at the source. Consistent with current interpretation and industry practice, the final rule requires that equipment be deenergized at 1.0 percent methane and that power be cut off at the source when the methane in the place reaches 1.5 percent.

Before any equipment is put back into operation, paragraph (b)(1) requires changes or adjustments to be made to the ventilation system to reduce the methane concentration below 1.0 percent. Like the existing rule, the final rule does not permit other work to be done in the affected area until the methane concentration is less than 1.0 percent.

A commenter objected to the removal of the existing term "changes or adjustments" in ventilation and permitting methane levels to be reduced by changes to the mining cycle. During public hearings, it became clear that the use of the term changes to the mining cycle was a cause of confusion. For this reason, the final rule retains from the existing standard the term changes or adjustments to the ventilation system and eliminates the reference to changes to the mining cycle that was proposed. As was indicated by the Agency during the public hearings, limiting the rate of production of coal to permit the existing ventilation system to maintain the level of methane below 1.0 percent constitutes a reasonable action to control the rate of methane liberation and is acceptable. In all cases, however, increasing the quantity or distribution of air continues to be an accepted means of reducing methane levels.

Paragraph (b) includes a new provision that specifies actions to be taken to protect miners when 1.0 percent or more methane is present in an intake air course. These actions are the same as those described under paragraph (b) for working places. A commenter objected to this provision, stating that the effect of the proposal would be to allow methane accumulations of up to 1.0 percent in intake air, while under existing standards methane is required to be below 0.25 percent in the intake. Other commenters indicated that 0.25 percent methane is not a significant concentration in a coal mine. One commenter stated that in some cases this concentration could be found where coal is being transported on a conveyor. Commenters generally indicated that it would be difficult or even impossible for most mines to maintain methane in intakes below 0.25 percent. Under the existing rule methane can accumulate in intake air courses without any action required of the operator to correct the condition unless the accumulation constitutes an imminent danger. The only exception to this is when intake air passes by abandoned areas. In this case the methane concentration is limited to 0.25 percent. Under the final rule § 75.323, when air passes by any opening of any unsealed area that is not examined under §§ 75.360, 75.361 or 75.364 of this subpart, it may not be used to ventilate any working place. The new provision limiting methane in intake air courses to 1.0 percent combined with the requirements of § 75.323 provides an increased level of safety to miners and the final rule includes the requirement as proposed.

Under § 75.352 (return air courses), entries used as return air courses must be separated from belt haulage entries. Therefore belt haulage entries must be ventilated with intake air, making them intake air courses. Thus paragraph (b) applies to belt haulage entries the same as it does to any other intake air course.

If 1.5 percent methane or more is present in a working place, an intake air course, or an area where mechanized mining equipment is being installed or removed, paragraph (b)(2) requires persons to be withdrawn from the affected area. This requirement is retained from the existing standard and the proposal and has been expanded to include areas where mechanized mining equipment is being installed or removed. In response to comments, the final rule clarifies the proposal and retains the existing provision which specifically states that persons referred to in § 104(c) of the Act may be permitted to remain in the area.

Paragraph (b)(2) also requires that all electric power to equipment in affected areas be disconnected at the power source. This prevents accidental energization of equipment and removes power from cables and circuits which may also be ignition sources. No other work is permitted in the affected area until the concentration of methane is less than 1.0 percent.

Paragraph (c)(1) requires changes or adjustment to the ventilation system when 1.0 percent or more methane is present in a return split of air between the last working place on a working section and where that split of air meets another split of air or the location at which such split is used to ventilate seals or worked-out areas. When 1.5 percent methane is present in this return split, paragraph (c)(2), like paragraph (b)(2), requires miners to be withdrawn, electric equipment to be deenergized and electric power to be disconnected at the power source, mechanical equipment to be shut off, and does not permit other work in the affected working section or the affected area until the methane concentration in the return air is less than 1.0 percent. For the purpose of this section, the air coursed through the belt entry or used to ventilate installations covered by §§ 75.340, 75.343, and 75.344 which is then directed into a return is not considered to be another split of air.

The specified action levels for return air courses in paragraphs (c)(1) and (c)(2) conform to the action levels in existing § 75.309 and are responsive to comments that these levels should be retained. However, unlike the proposal, and as discussed below, the final rule includes a special provision for return air courses derived from the existing distinction between section return air courses in general and those located in "virgin territory."

Commenters indicated that when the final rule requires electrical equipment to be deenergized at specified methane action levels, intrinsically safe electrical equipment should be permitted to remain in operation. Intrinsically safe equipment is designed to be incapable of releasing enough electrical or thermal energy under normal or abnormal conditions to ignite a flammable methane-air mixture. In particular, the commenters requested that MSHA allow intrinsically safe components of an AMS to remain in operation. MSHA agrees, and the rule permits intrinsically safe AMS to remain energized when all other mine electrical equipment must be deenergized. Section 75.351 requires that components of monitoring systems used in areas where permissible equipment is required be intrinsically safe.

Paragraph (d) establishes alternative methane action level requirements for section return air courses provided that additional safety precautions are followed. This alternative is derived from existing § 75.310, which recognizes that methane liberation can be higher in areas that are newly mined than in areas where previous mining has allowed methane to "bleed off." The existing rule allows mining to be conducted in "virgin" areas until the methane concentration in the return air course reaches 2.0 percent, provided certain safety precautions are followed. The final rule retains and augments these safety precautions and allows mining to continue in all areas of the mine until the methane concentration at any point in the return from a point opposite the section loading point to the location where the return split meets another split of air or the location where the split is used to ventilate seals or worked-out areas reaches 1.5 percent.

provided all of the safety precautions specified in paragraph (d) are followed. MSHA believes that in all cases where these measures are properly implemented, miners are provided with a level of safety at least equal to the level of safety otherwise provided by the methane levels specified in paragraph (c).

Among the additional safety measures the final rule sets for mining up to a level of 1.5 percent methane in the section return is a requirement that the minimum quantity of air in the split ventilating the active workings as determined in the last open crosscut must be 27,000 cubic feet per minute (cfm) or the quantity of air approved in the ventilation plan, whichever is greater. The final rule clarifies existing § 75.310 by setting a minimum quantity of 27,000 cfm in the last open crosscut. Under existing § 75.310, mining is permitted to continue provided twice the minimum quantity required for the last open crosscut in existing § 75.301 is maintained. One interpretation of existing § 75.310 is that since existing § 75.301 generally requires 9,000 cfm of air in the last open crosscut, the air quantity required under § 75.310 is 18,000 cfm. However, another interpretation is that since § 75.301 permits a greater quantity for the last open crosscut to be required by the district manager, the appropriate air quantity for compliance with § 75.310 is twice the minimum specified in the approved ventilation plan. Paragraph (d) establishes 27,000 cfm as a minimum air quantity but requires the level specified in the approved ventilation plan, when this quantity is greater than 27,000 cfm due to the conditions at a particular mine. The approved ventilation plan would set air quantity levels necessary to reduce methane accumulation in areas addressed by these alternative requirements.

The final rule retains the existing provision requiring the methane content in the return air split to be continuously monitored during mining operations. Paragraph (d) requires monitoring by an AMS. The AMS must give a visual and audible signal on both the working section and the surface when the methane content in the return air reaches 1.5 percent.

Section 75.351(b)(2) (atmospheric monitoring system (AMS)) clarifies the locations for monitoring the return air. When this alternative is chosen, the AMS must monitor methane at a point in the return air course opposite the section loading point. However, if auxiliary fans and tubing are used for face ventilation, the sampling location must be maintained at a point immediately outby the auxiliary fan discharge or at a point in the return opposite the section loading point whichever is the most outby. The AMS must also monitor the methane in the return immediately inby the point where the split of air meets another split of air, or the split of air is used to ventilate seals or worked-out areas.

The maximum allowable methane concentration in that part of the immediate return from the last working place on the section to a point in the return opposite the section loading point remains at less than 1.0 percent. Thus, the final rule does not reduce the level of protection provided by the existing rule.

A new precaution in paragraph (d) requires rock dust to be continuously applied with a mechanical rock duster during coal production. Rock dusting must start at a point in the return air course immediately outby the methane monitor located at a point opposite the section loading point. When auxiliary fans are used, rock dust must be applied immediately outby the fan discharge. Under paragraph (d), if 1.5 percent methane is present in the return air course, persons must be withdrawn from the affected areas and equipment, other than intrinsically safe AMS, in the affected area, must be deenergized and other mechanized equipment must be shut off. Also, under paragraph (d), changes or adjustments to the ventilation system must be made to reduce the concentration of methane to less than 1.5 percent. No other work is permitted in the affected area until the methane concentration in the return air is less than 1.5 percent.

The action levels for section return air courses in paragraphs (d) modify the Agency's interpretation of existing §§ 75.309 and 75.310. MSHA has interpreted these 2 sections, when read together, to allow mining in an environment containing up to 2.0 percent methane. This has not exempted the mine operator from the application of existing § 75.309 which requires the operator to make changes or adjustments in ventilation as soon as the level of methane rises above 1.0 percent. Also, under this interpretation, MSHA has not allowed mining to continue after the 2.0 percent level is exceeded until the methane concentration has been reduced below 1.0 percent. Commenters argued that this interpretation is unduly restrictive and renders existing § 75.310 meaningless. The final rule does not adopt this interpretation of existing §§ 75.309 and 75.310 but provides an alternative to the methane action level of 1.0 percent by specifying in paragraph (d) that changes or adjustments to the ventilation system must be made to reduce methane in the return air to less than 1.5 percent. When the safety precautions outlined in the rule are followed, the final rule provides protection to miners equivalent to the existing rule.

The provisions in paragraph (d) provide optional methane action levels. If the operator chooses not to follow the additional precautions, the provisions of paragraphs (c) apply. In all cases, the mine operator is required to comply with the methane levels specified in paragraphs (a) and (b), regardless of whether the operator chooses to follow the provisions of paragraph (d).

Paragraph (e) permits no more than 2.0 percent methane to be present in a bleeder split of air at a point just before the air in that split enters another split of air. Also, for return air courses, other than those addressed in paragraphs (c) and (d), paragraph (e) permits no more than 2.0 percent methane to be present. Thus the final rule retains the maximum permissible methane limits established in existing § 75.329 and makes mandatory the existing § 75.316–2 criteria concerning the methane limit in return air courses.

Section 75.324 Intentional Changes in the Ventilation System

This section revises existing § 75.322. It requires certain precautions when a change is made to increase or decrease ventilation on a working section in excess of the specified amount or when a ventilation change alters the main air current of the mine or any split of the main air current in a manner that could materially affect the health or safety of miners underground. Under these circumstances, the ventilation change must be supervised by a person designated by the mine operator. In addition, before the change is made, electric power must be removed from areas that may be affected by the change and mechanized equipment in those areas must be shut off. Also, only persons making the ventilation change are permitted in the mine while the change is being made. Afterward, certified persons must examine the areas affected by the change to determine whether methane accumulations or oxygen deficiencies have resulted. The final rule does not allow electric power to be restored to affected areas nor mechanized equipment to be restarted until these tests have been made and the areas are determined to be safe. Commenters suggested that persons other than those

making the ventilation change be permitted to remain in those areas of the mine not affected by the change. Because of the complexity of most mine ventilation systems and the difficulty in predicting the effect of a change on the entire system, MSHA has not included this suggestion in the final rule. As proposed, the final rule requires that persons other than those making the change be withdrawn from the mine.

Section 75.324 sets an action level of 9,000 cfm for ventilation changes on working sections in bituminous or lignite mines. The precautions required when this level is met or exceeded incorporate requirements found in many existing ventilation plans and are practices widely accepted by the mining industry. A ventilation change of 9,000 cfm is significant for any working section and necessitates deenergization of equipment, withdrawal of persons from the mine, and subsequent examination for hazards.

For anthracite mines, the final rule requires the specified precautions be taken when the ventilation change involves 5,000 cfm of air or more. This is consistent with § 75.325, which requires a minimum of 5,000 cfm of air to be maintained in the last open crosscut of anthracite mines.

MSHA recognizes that in some large mines a ventilation change of 9,000 cfm (5,000 cfm in anthracite mines) in the main air current of the mine or an individual split of the main air current may not necessarily be significant. Alternatively, in other mines changes of 9,000 cfm or less in the main air current or an individual split of the main air current could substantially affect total mine ventilation. Accordingly, these limits in the final rule do not apply to main air currents or to splits of the main air currents. Instead, the final rule specifies that the prescribed precautions must be taken when the ventilation change is one that "alters the main air current in a manner that could materially affect the safety or health of persons in the mine."

A commenter suggested that a record be maintained of all ventilation changes. Section 75.370(c) requires that any intentional change to the ventilation system that alters the main air current or any split of the main air current in a manner that could materially affect the safety and health of the miners, or any change to the information required in § 75.371 shall be submitted to and approved by the district manager before implementation. This requirement provides a greater degree of protection for the miner than does the maintaining of a record of these changes.

Section 75.325 Air Quantity

This final rule is derived from existing §§ 75.301, 75.301–1, and 75.301–3 and establishes minimum air quantity requirements for all underground coal mines.

The quantity of air in cubic feet per minute (cfm) is an important measure of underground coal mine ventilation. It is essential for miners' health and safety that each working face be ventilated by sufficient quantities of air to dilute, render harmless, and carry away flammable and harmful dusts and gases produced during mining. An insufficient quantity of air at a working face could permit methane to accumulate and lead to the development of other hazards.

The final rule retains the existing requirement that a minimum air quantity of at least 3,000 cfm reach each working face in bituminous and lignite mines where coal is being cut, mined, or loaded. Maintaining this minimum quantity of air at the face is a longstanding industry practice and is considered to be the minimum amount necessary for all mines to ensure that effective, reliable face ventilation is provided. Lesser quantities of air at the face have been shown to be inadequate to sweep face areas, thereby allowing methane to accumulate to dangerous levels. Therefore, since methane can be liberated at any time, even in a mine with little prior experience with methane liberation, the 3,000 cfm standard is retained as a minimum air quantity. Paragraph (a)(1) also requires that this minimum quantity be provided at working faces that are being drilled for blasting and that the locations of other working places or faces where a minimum air quantity is required and the quantity required be specified in the approved ventilation plan. If mining conditions dictate that a greater quantity of air is necessary at the face, the approved ventilation plan will set minimums greater than 3,000 cfm.

MSHA and Bureau of Mines studies of face ventilation systems show that the effectiveness of the face ventilation system depends on factors that include the volume of methane released and the volume of air delivered to the face by the ventilation system. See, for example, "Face Ventilation in Underground Bituminous Coal Mines: Airflow and Methane Distribution Patterns in Immediate Face Area-Line Brattice" (James V. Luxner; 1969) and "Evaluation of Face Ventilation Systems in Underground Coal Mines" (Haney, Banfield, and Gigliotti; 1984). Thus, in mines where methane liberation is high, a quantity of air greater than 3,000 cfm may be necessary to reduce the potential for methane ignitions at the face and to achieve compliance with other standards.

Paragraph (a)(2) specifies that the air quantity reaching the face must be determined at or near the face end of the line curtain, ventilation tubing, or other ventilation control device. MSHA also recognizes, however, the danger to miners of working beyond the last row of permanent supports and therefore requires that if the line curtain or tubing extends beyond the last permanent support, the quantity of air reaching the working face must be determined behind the line curtain or in the ventilation tubing just outby the last row of permanent supports.

MSHA had proposed that the quantity of air reaching the working face be greater than the operating volume of machine-mounted dust collectors and diffuser fans. A commenter stated that air in excess of the capacity of the dust collecting unit is counter productive to respirable dust control because excess amounts of air overrun the dust collector and suspend the dust in the air passing over the miners. The final rule does not retain this proposed language. To provide the necessary information to establish appropriate air quantities when dust collectors or diffuser fans are used, paragraph (a)(3) requires that the operating volume of these devices be specified in the approved ventilation plan.

Paragraph (b) requires the approved ventilation plan to specify the quantity of air reaching the last open crosscut in any pair or set of developing entries or rooms in bituminous and lignite coal mines. This approach, which is discussed in the explanation of § 75.371, accounts for varying mining conditions and types of face ventilation systems when establishing the air quantities necessary for effective methane and dust control at each mine. In no case, however, may the quantity of air reaching the last open crosscut be less than 9,000 cfm. Commenters stated that a minimum quantity is needed to be maintained in the last open crosscut in all mines and 9,000 cfm minimum is based on existing § 75.301. MSHA believes providing at least 9,000 cfm will ensure adequate ventilation of the section up to and including the last open crosscut. As in the existing rule, the final rule requires the necessary air quantity reaching the intake end of a pillar line to be specified in the approved ventilation plan and sets a 9,000 cfm minimum. The Agency intends that this minimum apply to sections which are not operating but are capable of producing coal by simply energizing the equipment on the section.

Recognizing that crews may be moved from section to section for various reasons, including equipment breakdown during the shift, the final rule includes the provision that this minimum quantity apply to sections which are not operating but are capable of producing coal by simply energizing the equipment on the section. Other sections requiring more than just energizing equipment to become producing sections may not need to be provided with the 9,000 cfm. However, ventilation changes to provide this minimum quantity must be made in accordance with § 75.324 of the final rule prior to production.

Paragraph (c) is a new provision addressing longwall mining systems. It requires that at least 30,000 cfm of air reach each working longwall face. The proposed rule required at least 20,000 cfm of air to reach each working longwall face. However, based on a report by MSHA's Office of Technical Support entitled "Evaluation of Respirable Dust Control on Longwall Mining Operations" (Ondrey, *et al.*, paper presented at SME Annual Meeting, Salt Lake City, Utah, February 28, 1990) the final rule now requires a minimum quantity of 30,000 cfm. These tests have shown that this was the minimum amount of air required to achieve adequate ventilation of the longwall face during the study. Like the provision for mean entry air velocity, paragraph (c) provides that a lesser air quantity can be approved in the ventilation plan if the operator demonstrates that the lesser quantity will maintain continual compliance with applicable methane and respirable dust standards. If conditions warrant, the final rule allows a greater quantity to be required in the approved ventilation plan. To ensure that the necessary air quantity is reaching the working face, § 75.360(c)(2) requires the quantity to be determined in the intake entry or entries at the intake end of the longwall face immediately outby the face.

In addition, for the installation and removal of mechanized mining equipment, paragraph (d) requires that the area be ventilated and that the quantity of air and the ventilation controls required be specified in the approved ventilation plan. This is a new provision that greatly enhances the protection provided miners.

MSHA believes that the minimum air quantity requirements in existing § 75.301 were not established to address the particular conditions of anthracite mines. Unlike in bituminous and lignite mines, electric face equipment is rarely used in anthracite mines, reducing the amount of air necessary to control hazards from dust, methane, and other gases. Additionally, the quantities specified in the final rule for anthracite mines help to minimize the effects of the severely cold and wet conditions of many anthracite mines. Paragraph (e) separately addresses anthracite mines and requires a minimum 1,500 cfm quantity of air to reach each working face where anthracite coal is being mined unless a greater quantity is specified in the approved ventilation plan. Existing § 75.301 requires 3,000 cfm of air in these areas. The final rule also reduces from 9,000 to 5,000 cfm the air quantity required to pass through the last open crosscut in each set of entries or rooms and the air quantity required at the intake end of any pillar line. The approved ventilation plan may specify a greater quantity if conditions warrant. These changes reflect Agency experience with respect to petitions for modification. The air quantities in the final rule do not reduce the level of protection provided miners in anthracite mines. The final rule retains the existing requirement for anthracite mines that when robbing areas where air measurements cannot be obtained, the air must have perceptible movement.

Section 75.326 Mean Entry Air Velocity

This section is derived from existing § 75.301–4, and retains the existing requirement that a minimum mean entry air velocity of 60 feet per minute (fpm) be maintained in all working places using exhausting face ventilation systems. The mean entry air velocity is the average velocity across the cross section on the intake side of the working place and is an important factor in controlling respirable dust in exhausting face systems. Like the existing rule, the final rule permits lower mean entry air velocities to be specified in the approved ventilation plan, provided the lower air velocities will maintain concentrations of methane and respirable dust within the limits of the applicable standard. This provision in the final rule clarifies the existing standard. The existing standard states that a mean entry air velocity lower than 60 fpm may be approved if it "reduces the level of respirable dust to lowest attainable level." Arguably, the "lowest attainable level" could be a level of respirable dust exceeding the 2.0 mg/m^3 limit set in existing § 70.100(a). By referencing the applicable dust standard, the final rule removes this ambiguity.

Like the existing standard, the final rule establishes a minimum mean entry air velocity of 60 fpm for working faces where coal is being cut, mined, or loaded unless otherwise specified in the approved ventilation plan. Also, to achieve the same level of protection as the existing rule, the final rule requires a minimum mean entry air velocity of 60 fpm for working faces where coal is being drilled for blasting unless otherwise specified in the approved ventilation plan and for other working places as specified in the approved ventilation plan.

Under the final rule, the mean entry air velocity must be measured at or near the inby end of the line curtain or other face ventilation control device. Unlike the existing provision, however, the final rule does not include instructions for calculating the mean entry air velocity. This aspect of the final rule does not reduce the level of protection provided miners by the existing rule. By eliminating the existing provision, the final rule permits direct measurement, using a traverse method, to determine the mean entry air velocity on the intake side of the working place whenever such measurement is possible. The final rule also permits the method prescribed in the existing rule. This method finds the mean entry air velocity by determining the quantity of air at the inby end of the line curtain and dividing this quantity by the cross-sectional area of the intake side of the working place.

Section 75.327 Air Courses and Trolley Haulage Systems

Paragraph (a) retains the requirement of existing § 75.327. It applies to intake air courses where trolley wires or trolley feeder wires are installed and allows an authorized representative of the Secretary to require a sufficient number of entries or rooms as intake air courses to limit the velocity of air in the haulageways to minimize hazards with fires and dust.

Paragraph (b) retains the requirement of § 75.327–1 that sets a maximum of 250 fpm air velocity in haulage entries where trolley wires and trolley feeder wires are located at a maximum of 250 fpm, unless a higher velocity is approved by the district manager.

The proposed rule specified a minimum air velocity of 50 fpm to ensure adequate ventilation in these entries. As with the proposed requirement for two escapeways ventilated with intake air and the alternative that would have permitted air in the belt haulage entry to be used to ventilate working places under certain conditions, the requirement for a 50 fpm minimum velocity in belt haulage entries has been referred to an advisory committee.

Section 75.330 Face Ventilation Control Devices

This section consolidates and modifies §§ 75.302 through 75.302–3. It requires brattice cloth, ventilation tubing, and other face ventilation control devices to be made of flame-resistant material approved by MSHA. Also, the rule requires these devices to be installed at each working face from which coal is being cut, mined, drilled for blasting, or loaded, and at other working faces as specified in the approved ventilation plan.

Existing § 75.302–3 requires brattice cloth or ventilation tubing to have a flame spread index of 25 or less as determined by ASTM methods of test E–84 or E–162. Paragraph (a) replaces this provision with a new requirement that brattice cloth, ventilation tubing and other face ventilation control devices be made of flame-resistant material approved by MSHA. To be approved by MSHA for use underground, any brattice cloth and ventilation tubing purchased after August 15, 1992 must pass tests for flame resistance in accordance with 30 CFR part 7, which were established after the existing standard. Brattice cloth and ventilation tubing purchased before August 16, 1992 which passed the requirements of § 75.302–3 may continue to be used. Paragraph (b)(1) requires face ventilation control devices to be used to provide ventilation to each working face where coal is being cut, mined, drilled for blasting, or loaded, and to other working places specified in the approved ventilation plan. Effective ventilation necessitates the use of line curtain or other devices for all areas where coal is being produced, as well as other areas to be specified in the approved ventilation plan such as where roof bolting is being done.

Paragraph (b)(2) is derived from existing § 75.302–1. It requires ventilation control devices to be maintained at a distance of 10 feet from the point of deepest penetration of the face unless an alternative distance that will maintain concentrations of respirable dust, methane, and other harmful gases below applicable standards is specified in the approved ventilation plan. Under this provision, line brattice, for example, may be located more than 10 feet from the face if the operator can maintain compliance with the applicable standards for respirable dust and methane and if the alternative distance is approved in the ventilation plan. MSHA's experience with the existing standard shows that ventilation controls used more than 10 feet back from the face can often effectively control methane and dust when used in conjunction with supplementary ventilation devices such as machine-mounted dust collectors, spray fan systems, or diffuser fans. This practice also helps to prevent damage to or displacement of the control devices during the mining process and eliminates the potential exposure of miners to unsupported roof.

Commenters expressed concern that the proposed rule did not specify 10 feet as a maximum distance from the face for line brattice. The Agency has considered these comments and has modified the final rule accordingly.

A commenter suggested that the final rule should specify that face ventilation control devices must be repaired immediately when damaged. The commenter indicated that if ventilation controls are damaged or become inadequate to ventilate a face, a potentially dangerous situation can develop if mining continues. MSHA agrees that immediate repair of ventilation control devices is an important practice. Under the final rule, effective repairs to ventilation control devices will be necessary to maintain compliance with §§ 75.323 and 75.325. Section 75.323 prohibits mining in face areas if the methane concentration at the face exceeds 1.0 percent. Section 75.325 requires that 3,000 cfm of air, or a greater quantity if required in the approved ventilation plan, must be provided at all times to each working face where coal is being cut, mined, drilled for blasting, and other places if specified in the approved ventilation plan. When a damaged or displaced ventilation control does not provide enough ventilation to face areas to meet these requirements, the operator must immediately take action to repair the affected ventilation controls.

Similarly, the final rule does not retain the provision in the existing rule requiring that adequate space be provided between the coal rib and the line brattice or other devices. Removal of this provision does not reduce the level of protection provided miners. To comply with the methane requirements of § 75.323 and the air quantity requirements of § 75.325, ventilation control devices must be located to provide space between the device and the rib that is sufficient to allow ventilation to reach the working face. Thus, in all cases under the final rule, line brattice must be properly installed to achieve adequate face ventilation.

The final rule also does not retain the existing requirement that check curtains required with line brattice be installed to minimize air leakage and to permit traffic to pass without adversely affecting face ventilation. Like the existing requirement to provide adequate space between the line brattice and the nearest rib, MSHA believes that this aspect of the existing rule is unnecessary and its removal thus does not reduce the level of protection provided by existing § 75.302–1. If check curtains are improperly installed, ventilation to the working face will be interrupted or significantly reduced. Thus, to comply with the relevant air quantity requirements in the final rule, check curtains will have to be installed in a manner that minimizes air leakage and permits traffic to pass without adversely affecting face ventilation.

Section 75.331 Auxiliary Fans and Tubing

This section is derived from and clarifies existing § 75.302–4 and sets requirements for the operation of auxiliary fans used to provide ventilation to face areas instead of or together with line brattice systems.

Paragraph (a) retains the existing requirement that auxiliary fans, when electrically operated, must be permissible. Also, the rule requires all fans to be maintained in proper operating condition. As suggested by a commenter, the existing provision that requires fans to be inspected frequently by a certified person when in use is retained as part of the on-shift examination (§ 75.362(e)). Regular fan inspection by the operator is an element of maintaining fans in proper operating condition and the frequency of the inspection is dependent on mine specific conditions. Under the final rule, MSHA expects operators to inspect auxiliary fans at whatever intervals are necessary to ensure the fans remain in proper operating condition at all times and that the methane content in the air discharging from the fan does not exceed applicable levels.

As proposed, the final rule requires auxiliary fans to be deenergized when no one is present on the working section. This prevents electrically operated fans from developing malfunctions or creating ignition or explosion hazards that might not be detected until someone returns to the section. The final rule retains the requirement in the proposal that requires auxiliary fans to be located and operated to avoid recirculation of air.

Paragraph (b) requires deficiencies in auxiliary fans to be corrected immediately or the fan must be deenergized. Also, like the existing rule, when the air passing through the auxiliary fan or tubing contains 1.0 percent methane, paragraph (c) requires

electrical equipment in the working place and the auxiliary fan to be deenergized and other mechanized equipment in the working place to be shut off. Like the existing requirement, the final rule does not permit this equipment to be restarted until the methane concentration is reduced to less than 1.0 percent.

Paragraph (d) also retains existing requirements that address situations in which an auxiliary fan is stopped, either intentionally as during idle periods, or due to failure of the fan. The final rule requires line brattice or other face ventilation control devices to be used to maintain ventilation to affected faces when the auxiliary fan is not in operation. This provision is aimed at avoiding "dead" air spaces that can result when auxiliary fans cease providing ventilation to the face. As an additional precaution to reduce the possibility of methane ignitions during the interruption in ventilation, paragraph (d)(2) requires electrical equipment in the affected working places to be disconnected at the power source and other mechanized equipment to be shut off. When ventilation to the working place is restored, either through the use of line brattice or other face ventilation control devices under paragraph (d)(1) or by restarting the auxiliary fan, mining activities in the working place may resume.

The final rule does not retain the existing provision prohibiting operation of auxiliary fans during stoppage of mine ventilation and until methane has been removed. The existing provision also states that removal of methane must be accomplished by conducting the air current into the working place by line brattice or an equivalent device. Although these provisions are not retained, the final rule does not reduce the level of protection provided by the existing rule. Under § 75.313, auxiliary fans must be deenergized during unscheduled main fan stoppages. Similarly, § 75.311 prohibits operation of auxiliary fans during planned main fan stoppages. Also, the final rule does not permit auxiliary fans to operate if 1.0 percent or greater methane is passing through the auxiliary fan.

The final rule does not retain the existing provision specifying that face ventilation systems using auxiliary fans and tubing or machine mounted diffusers must be approved in the ventilation plan. Under § 75.371 of the final rule, the approved ventilation plan must include information regarding all face ventilation systems used in the mine, as well as drawings illustrating how such systems are used on each working section.

Section 75.332 Working Sections and Working Places

Paragraph (a) of this section is derived from existing §§ 75.319 and 75.319–1, while paragraph (b) revises existing §§ 75.311 and 75.312. The final rule requires that each working section be ventilated with a separate split of intake air directed by overcasts, undercasts, or other permanent ventilation controls. This provides miners on each section with at least one fresh air intake not contaminated with gases or dust from another set of mining equipment. Keeping with existing practice, the final rule allows more than one set of mining equipment on a split, with the condition that only one set at a time may be used for cutting, mining, or loading coal or rock. Thus, one set may be repositioned or serviced while the other set is mining. The rule defines a set of mining equipment to include a single loading machine, a single continuous mining machine, or a single longwall or shortwall machine. Thus MSHA considers a double drum longwall shearer to be one longwall machine. Also, consistent with existing Agency interpretations, MSHA does not consider a scoop a loading machine for purposes of requiring separate splits of air.

When two or more sets of mining equipment are simultaneously engaged in cutting, mining, or loading coal or rock from working places within the same working section, each set of equipment must be ventilated by a separate split of intake air. Thus, methane or dust produced during production activities by one set of equipment does not harm miners working with another set of equipment. This requirement also applies to longwall or shortwall sections if more than one longwall or shortwall mining machine is used.

A commenter expressed concern that paragraph (a) allows the use of a "super section"; that is, two sets of mining equipment operating simultaneously and sharing a common dumping point on the same section, with each set being ventilated by a separate split of intake air. MSHA has long permitted super sections under existing § 75.319. This experience has shown that super section mining can be done safely provided mining equipment is not being used to cut, mine, or load coal or rock material simultaneously in the same air current. To accommodate this type of mining, the current of air directed into the section must be split ("fishtailed") near the working places so that two splits of intake air ventilate the faces. This provides a separate split of air for each set of mining equipment. The final rule continues to allow super sections with separate splits of intake air.

Paragraph (b) is derived from existing §§ 75.311 and 75.312 and clarifies these provisions by eliminating the use of the term "abandoned area." The term "abandoned area" is not used in the final rule. Existing § 75.2 (h) defines "abandoned area" as a portion of the mine that is not ventilated and examined in the manner required for working places under subpart D. The term "abandoned area" has been a source of confusion, particularly with respect to the term "idle area," and with the existing definition of "active workings" in § 75.2.

To eliminate this confusion, paragraph (b)(1) prohibits air from being used to ventilate a working place if the air has passed through any area that is not examined under §§ 75.360(d), 75.361, or 75.364. The final rule also does not permit air that has passed through any area where second mining has been done to be used to ventilate a working place. Second mining is defined as intentional retreat mining where pillars have been wholly or partially removed, regardless of the amount of recovery obtained. Thus, air that has passed through any of these areas may not be used to ventilate any working place, regardless of the methane content in the air. MSHA believes that by making this change, the final rule reduces the possibility of advancing working places being ventilated by air containing methane or other gases.

A commenter questioned the proposed provision, indicating that it would permit air that has passed by openings of areas where mining has been completed to be used to ventilate working places if the intake air contained less than 1.0 percent methane, an action level for intake air courses specified in § 75.323. The commenter said that this aspect of the proposal would reduce the level of protection provided miners by existing § 75.311.

Considering this comment, the Agency has included a provision in paragraph (b)(2) prohibiting air that has passed by an opening of any unsealed area that is not examined under subpart D to be used to ventilate any working place, whatever the methane content in the air. Like the provision contained in paragraph (b)(1), the provision in paragraph (b)(2) helps ensure that adjacent working places are not endangered by methane or other gases in other areas of the mine.

Neither paragraph (b)(1) nor (b)(2) is intended to prevent retreat mining. The existing rule allows ventilation of pillars along the pillar line, though the air has ventilated adjacent pillars, to maintain an orderly sequence of pillar extraction.

Section 75.333 Ventilation Controls

This section is derived from existing §§ 75.328 and 75.1707 and from criteria in § 75.316–2 used for the approval of mine ventilation plans. It applies to all workings, including extensions of existing air courses, haulageways, escapeways, and areas where trolley wires or trolley feeder wires are located. The final rule consolidates into one standard the locations where permanent stoppings and other permanent ventilation controls must be erected and maintained.

For purposes of this section of the final rule, paragraph (a) defines "durable" as material that, when used to construct a ventilation control, results in a control that is structurally equivalent to an 8-inch hollow-core concrete block stopping with mortared joints, as tested under section 12 of the American Society for Testing and Materials (ASTM), "Standard Methods of Tests of Panels for Building Construction," E72–80. In response to comments, the final rule clarifies that the material must pass the test specified in section 12, Transverse Load-Specimen Vertical.

Permanent stoppings maintain the integrity of intake and return air courses. Therefore, paragraph (b)(1) requires new permanent stoppings or other permanent ventilation controls between intake and return air courses, beginning at the third connecting crosscut outby each working face. This provision is based on the existing criterion in § 75.316–2(b). The proposal would have required permanent stoppings to be installed from the fourth connecting crosscut outby the face. MSHA had intended this provision to allow check curtains to be arranged in a way that reduces the necessity of driving equipment through a check curtain. A commenter objected to this proposal, stating that permitting an additional stopping with temporary ventilation controls would result in excessive leakage between entries, thus causing some short circuiting of air away from the working places. MSHA agrees and the final rule retains the existing provision but allows alternatives to maintaining stoppings or other permanent controls to the third crosscut, if specified in the approved ventilation plan.

The final rule includes the proposed provision permitting temporary ventilation controls to be installed between intake and return air courses instead of permanent stoppings or other permanent ventilation controls in rooms advanced less than 600 feet from the center line of the entry from which the room was developed. A commenter objected, stating that permanent stoppings and other permanent controls should be required in all rooms, regardless of the distance the room is advanced. The commenter stated that temporary ventilation controls do not adequately maintain the integrity of the ventilation system if the temporary controls alone direct the air current to the working place. Commenters particularly stressed the need for permanent stoppings to be used to separate conveyor belts in rooms from intake and return air courses because the hazards associated with conveyor belts are the same for all belts, regardless of length. The Agency has considered all comments, and consistent with longstanding policy, the final rule permits the use of temporary controls in rooms less than 600 foot in depth because these rooms are used for a short duration and the minimum air quantity must be maintained regardless of the controls used.

Paragraph (b)(2) requires that belt conveyor haulageways be separated by permanent stoppings or other permanent ventilation control devices from return air courses and paragraph (b)(3) requires that they be separated by permanent stoppings or other permanent ventilation control devices from intake air courses when the air in the intake air course provides air to active working faces. Paragraph (b)(4) requires stoppings or other permanent ventilation controls to be used to separate primary escapeways, as required by § 75.380(g). A commenter stated that the proposed rule would not require belt entries to be separated by permanent stoppings from intake air courses. However, like the proposal, the final rule specifies, with clarifying changes, that belt entries must be separated from the primary escapeway and paragraph (b)(3) clarifies the separation between belt haulage entries and other intake air courses. Under §§ 75.380 and 75.381, the primary escapeway must always be an intake air course. Conversely, under § 75.352, the belt entry must be ventilated with intake air. This aspect of the final rule is consistent with existing standards and allows the belt entry to be used as the alternate escapeway.

Paragraph (c) adds the requirement that personnel doors and door frames in stoppings must also be made of noncombustible material. These doors are also required to be of sufficient strength to serve their intended purpose of maintaining separation and permitting travel between air courses or entries. The Agency does not consider conveyor belt or other similar material to be suitable for the construction of personnel doors. Paragraph (c)(1) is a new requirement for personnel doors installed after August 15, 1992, to be installed in permanent stoppings separating air courses and haulageways at 300-foot intervals in coal heights below 48 inches and at 600-foot intervals in coal heights 48 inches or higher. In a mine emergency, the ability to travel between such entries can be life saving. Without doors, miners might have to travel for hundreds or even thousands of feet in entries filled with smoke or other hazards before a means to exit that air course can be found. The final rule also takes into account that miners are unable to travel as quickly in lower coal seams. Also, the final rule requires the location of doors in all escapeways to be clearly marked so that persons can easily identify the doors when traveling in the escapeway or in the entries on either side of the doors.

Paragraph (d) requires doors, other than personnel doors, installed after August 15, 1992, to be constructed of noncombustible material or coated on all accessible surfaces with flame-retardant material having a flame-spread index of 25 or less, as tested under ASTM E162–87. This would permit the continued use of wood for the construction of doors, such as track doors, provided they are coated in the proper manner with an appropriate flame-retardant material. Doors, other than personnel doors, must also be of sufficient strength to serve their intended purpose of maintaining separation and permitting travel between or within air courses or entries.

Paragraph (d)(3) requires that doors, other than personnel doors, when used, be installed in pairs to form an airlock. Airlocks are often used underground to permit machinery to travel from one air course to another air course or within air courses or entries without disrupting ventilation. This maintains the integrity of intake and return air courses when doors, other than personnel doors, are installed. When in use, one door in the airlock must remain closed. When the doors are not being used, both sides must be closed.

Paragraph (e) is derived from existing criteria and requires all overcasts, undercasts, shaft partitions, permanent stoppings, and regulators to be made of durable and noncombustible material such as concrete, concrete block, brick, cinder block, tile, or steel. As a matter of clarification and consistent with current

understanding, regulators have been specifically added to the list of permanent ventilation controls in paragraph (e)(1). The Agency has always considered regulators, which are normally built in permanent stoppings, to be permanent ventilation controls and § 75.1202–1, temporary notations, revisions and supplements, of the Chapter specifically identifies regulators as a permanent ventilation control. Ventilation controls constructed of such materials provide protection against the spread of fires at these locations. When fire burns through a stopping or other ventilation control, the harmful products of combustion contaminate a greater area, increasing the danger to miners' lives. Thus, the final rule does not permit the use of materials that can fail quickly during fires, such as aluminum.

During an underground coal mine fire, temperatures can reach 1500 to 2000 °F. MSHA believes that aluminum is not an appropriate construction material for ventilation controls because most aluminum alloys fail at temperatures below 1500 °F. Most aluminum alloys melt at a temperature of approximately 1100–1200 °F and show a reduction of strength at temperatures well below this. For these reasons, the Agency does not consider aluminum a "noncombustible" material.

The Agency, however, also recognizes that coatings may be available that, when applied to aluminum, could provide protection against fire for extended periods of time. Consistent with this, the Agency has permitted appropriately coated aluminum ventilation controls to be used in some mines. While the final rule does not require these aluminum ventilation controls already in use in underground mines to be removed, no new aluminum controls may be installed after August 15, 1992. Furthermore, MSHA will not permit aluminum controls to be removed and reinstalled elsewhere in the mine.

Some commenters questioned whether the final rule would permit the use of steel ventilation controls. They stated that these controls can be superior to traditional masonry structures used underground because fire will not cross through steel controls as easily, entry convergence does not damage them, and the structures have superior air-holding capacities. Another commenter objected to the use of steel as a construction material, stating that steel is inferior to other materials that can be used to build ventilation controls. After considering all the comments, MSHA finds that, as with any material used to build permanent ventilation controls, steel can be used if the steel structure is durable and noncombustible. No construction material is permitted unless it meets these definitions, including steel. Thus, listing steel among the specified materials in the rule does not reduce the protection provided miners by the existing rule.

In response to other comments, paragraph (e)(2) separately addresses anthracite mines and permits permanent stoppings to be constructed of overlapping layers of hardwood boards. To provide sufficient strength and fire-resistance characteristics, the rule requires the stoppings to be a minimum of 2 inches thick. Due to the pitch and configuration of anthracite mines, stoppings are constructed nearly or entirely horizontal to the entries they separate, rather than vertically. Under these circumstances, and due to the extremely wet conditions in most anthracite mines, hardwood provides entry separation that is superior to other construction materials. The use of wood to build permanent stoppings in anthracite mines does not reduce the protection provided miners by the existing rule in these mines.

The requirement that ventilation controls be constructed of durable and noncombustible material is derived from recommendation No. 7 of MSHA's report, "Two-entry Longwall Mining Systems—A Technical Evaluation." As the report indicates, 8-inch hollow-core concrete block is typical of construction material used for ventilation controls in underground coal mines. Therefore, to establish minimum fire resistance and structural requirements for ventilation controls, the 8-inch block with mortared joints is used.

The amount of static pressure a material will withstand is demonstrated by ASTM test E72–80, "Standard Methods of Tests of Panels for Building Construction," Transverse Load-Specimen Vertical. Structurally sound material will withstand the same or greater static pressure as concrete block (approximately 39 pounds per square foot) when this pressure is applied according to ASTM E72–80.

To be considered noncombustible under the final rule, a material must be capable of maintaining its function as a ventilation control for a period of time in the event of a fire. To be considered a "noncombustible material" the permanent control that is constructed of the material must not rupture or otherwise fail while being subjected to a fire test incorporating an ASTM E119–88 time/temperature heat input, or equivalent, for 1 hour. MSHA considers a rating of 1 hour to be a reasonable time for miners to reach safety during an emergency.

Paragraph (e)(3) permits timbers, to create a stopping in heaving or caving areas of mines. As with all material used to construct permanent ventilation controls, when timbers are used they must be capable of passing the tests for a noncombustible and durable material. This means that when timber is used to construct a ventilation control the control must be capable of serving its intended function when subjected to a fire test incorporating an ASTM E119–88 time/temperature heat input, or equivalent. Also, when timber is used to construct a ventilation control the control must be structurally equivalent to an 8-inch hollow-core concrete block stopping with mortared joints according to ASTM E72–80 Section 12—Transverse Load-Section Vertical, load only. However, the Agency recognizes that timber may provide additional fuel to a fire, and therefore paragraph (e)(3) requires that when timbers are used to create stoppings in heaving or caving areas, the stoppings must be coated on accessible surfaces with a flame-retardant material having a flame-spread index of 25 or less when tested according to ASTM E162–87 (Surface Flammability of Material Using a Radiant Heat Source). Similarly, a new requirement is that when sealants are applied to any ventilation controls, the sealant must have a flame-spread index of 25 or less, ASTM E162–87. Based on recommendation 19 in MSHA's Two-Entry Report, this requirement applies to all mines because ventilation controls coated with flame-retardant materials are less susceptible to failing quickly in the event of a fire and therefore contributing to the fire's intensity. Certain ventilation controls may require application of a sealant to prevent or reduce air leakage. If so, it is important that the sealants themselves do not contribute to the propagation of a flame or flame penetration.

Derived from existing criteria, paragraph (g) requires a crosscut to be made before mining is discontinued in an entry or room that has been advanced more than 20 feet. Alternatively, the final rule permits line brattice to be installed to maintain adequate ventilation. Either of these alternatives should prevent the creation of "dead-air" spaces where methane could accumulate and create an ignition or explosion hazard. It is not the Agency's intent that this provision be used to permit places to be advanced for extended distances using only line curtain to provide ventilation. In response to comments, the final rule

specifies 20 feet instead of 30 but emphasizes that this distance must be measured from the inby rib. The rule also permits distances less than 20 feet to be specified in the approved ventilation plan when conditions such as methane liberation warrant.

Section 75.334 Worked-out Areas and Areas Where Pillars Are Being Recovered

The final rule is derived from existing §§ 75.328 and 75.329 and from ventilation plan approval criteria in existing § 75.316–2. These existing provisions specify use of bleeder entries, bleeder systems or an equivalent means in pillared areas to control the accumulation of methane and other gases. During and after pillar recovery, methane gas is liberated from the coal and strata. When this occurs, bleeder systems route gases away from worked-out areas and areas where pillars are being mined. The final rule revises the requirements for bleeder systems and establishes ventilation standards for control of methane and other harmful gases, dusts, and fumes in worked-out areas and for areas where pillars are being mined.

Paragraph (a)(1) requires worked-out areas where no pillars have been recovered to be ventilated so that methane-air mixtures and other gases, dusts, and fumes are continuously diluted and routed into a return air course or to the surface of the mine. If these areas are not ventilated, the final rule requires them to be sealed.

Where pillars are being fully or partially recovered, paragraph (b)(1) requires a bleeder system to be used to control the air passing through the area and to continuously dilute and move methane-air mixtures and other gases, dusts, and fumes from the worked-out area away from active workings and into a return air course or to the surface of the mine. When pillar extraction is completed in an area, paragraph (b)(2) requires a bleeder system to be maintained to ventilate the worked-out area, or the area must be sealed.

The final rule eliminates the description of a bleeder system that was proposed. Instead, the final rule requires that the bleeder system used be specified in the approved ventilation plan. Requiring the bleeder system to be specified and approved does not reduce the protection provided miners by the existing provisions addressing bleeders. Under the existing rules, MSHA generally considers bleeders to be a system of entries that form special air courses designed, developed, and maintained to continuously move gases from retreat mining areas. This type of bleeder system would continue to be acceptable under the final rule. However, instead of stating that systems "equivalent" to this type of bleeder may be used, as under the existing standards, MSHA has required that the design and use of bleeder systems that will continuously dilute and move methane-air mixtures and other gases, dusts, and fumes away from worked-out areas and into a return air course or to the surface be specified and approved in the ventilation plan. This permits the operator to tailor the bleeder system to the conditions in the particular mine where it will be used. MSHA recognizes that the methods that will effectively remove harmful gases from a worked-out area depend on particular mining conditions. Different mines have different conditions and methane liberation rates, such as small hilltop mines with minimum overburden, short-term operation and minimum methane liberation versus large, deep, long-term operation mines that liberate large volumes of methane. For this reason, the type of bleeder system used and its design is best handled through the approved ventilation plan.

The final rule does not retain the requirement in existing § 75.316–2(e) that bleeders must extend from active pillar lines to the intersection of the bleeder split and must not include active workings. This does not reduce the protection provided by the existing rule, because the final rule includes the requirement that any bleeder system used must continuously move gases from the mined-out area and away from active workings into a return air course or to the surface.

For the same reasons, the final rule does not specifically retain the existing plan approval criterion that the ventilation pressure differential between the active pillar line and the junction of any bleeder connection to the bleeder entries should always be adequate to drain gas from the worked-out area. Also, the final rule does not specify that this pressure differential will be considered adequate where perceptible air flow exists in all open or regulated bleeder connections, as determined with chemical smoke or other approved means. As discussed below, bleeder systems must be examined at least every 7 days under § 75.364. As part of this weekly examination, MSHA requires tests at specified locations to determine whether the air is moving in its designated direction. The use of chemical smoke tubes to make this determination is a safe and accepted practice in the mining industry.

Paragraphs (c)(3) and (c)(4) retain the existing provisions in § 75.316–1(b)(5)(i) that the operator specify in the approved ventilation plan the method that will be used to maintain bleeder entries free of obstructions such as roof falls and accumulations of water and the location of ventilating devices such as regulators, stoppings, and bleeder connectors used to control air movement through the worked-out area. The proper functioning of a bleeder system is dependent upon bleeder entries remaining open and necessary controls being maintained. For this reason, the existing provision has been retained.

Like the existing provisions, the final rule also addresses evaluation of bleeder systems and worked-out areas. Section 75.364 requires evaluation of worked-out areas where no pillars have been recovered, and of bleeder systems, during the weekly examination of the mine. For worked-out areas where no pillars have been recovered, § 75.364 requires weekly travel to the area of deepest penetration and measurements and tests at locations where the effectiveness of the bleeder ventilation system can be determined. Similar examination requirements are specified for bleeder systems used during and after pillar recovery.

Accumulation of methane and oxygen-deficient atmospheres pose serious hazards in worked-out areas. The potential for ignitions and explosions is always present unless steps are taken to prevent these accumulations. Adequate ventilation of worked-out areas and proper examination, either by weekly travel of the entire bleeder or to locations where measurements and tests can be made to determine the effectiveness of the system.

Under paragraph (d), if the bleeder system for a worked-out area does not continuously move methane-air mixtures and other gases, dusts, and fumes away from the worked-out area into a return air course or to the surface of the mine, or if the effectiveness of the bleeder system cannot be shown by examinations or evaluations done under § 75.364, the worked-out area must be sealed. Paragraph (e) retains the requirement from existing § 75.330 that each mining system be designed so that worked-out areas can be sealed. The location of proposed seals for worked-out areas must be included on the ventilation map for the mine under § 75.372.

The final rule does not retain the ventilation plan approval criterion in existing § 75.316–2(e) that "Bleeder entries should be connected to those areas from which pillars have been wholly or partially extracted at strategic

locations in such a way as to control airflow through such gob, to induce drainage of gob gas from all portions of such gob areas, and to minimize the hazard from expansion of gob gases due to atmospheric pressure change." Worked-out areas with poorly designed bleeder systems that are determined through weekly examination to be inadequate to remove gases from the areas must be sealed under paragraph (d), as noted. Consequently, the Agency finds it unnecessary to set specific instructions for bleeder design.

Instead of a weekly examination by a person, the use of an AMS would have been permitted under the proposal for evaluation of worked-out areas from which no pillars have been removed and for bleeder systems. Because of the inability of AMS to inform the operator of roof conditions and water buildup, as indicated by a commenter, the Agency has reconsidered this proposal and the final rule does not permit the use of AMS for evaluating worked-out areas instead of weekly examinations.

Several commenters suggested that bleeder systems should not be required for all mines, stating that in some mines the practice of ventilating worked-out areas increases the risk of spontaneous combustion by supplying oxygen to combustion-prone materials in these areas. These commenters requested that the final rule include provisions to address spontaneous combustion. MSHA recognizes the need to reduce the flow of oxygen to areas where there is a likelihood of spontaneous combustion. The final rule requires the approved ventilation plan to address spontaneous combustion in mines with a demonstrated history of this hazard, or that are located in coal seams determined to be susceptible to spontaneous combustion. Although MSHA anticipates that this provision will apply to only a few mines, a demonstrated history of spontaneous combustion may be a single event that was determined to be the result of spontaneous heating or smoldering of coal. Additionally, studies by the Bureau of Mines and MSHA have identified the volatile properties of coal seams and have determined that certain seams are susceptible to spontaneous combustion. The final rule is directed to mines in these seams. Under paragraph (f), the approved ventilation plan for mines that are susceptible to spontaneous combustion must specify measures to detect methane, carbon monoxide, and oxygen concentrations in worked-out areas. These measures must be taken during and after pillar recovery and in worked-out areas where no pillars have been recovered. The purpose of these measurements is to determine if worked-out areas must be ventilated or sealed. If the methane concentration or other hazards in the worked-out area cannot be controlled while the mine is limiting airflow to avoid spontaneous combustion, ventilating or sealing the worked-out area may be necessary. Measurements also help to determine the extent to which the worked-out areas can be ventilated without increasing the spontaneous combustion hazard. Under paragraph (f)(2) the operator is required to specify the action that will be taken to protect miners from the hazards of spontaneous combustion. If, after making this evaluation, the mine operator determines that a bleeder system should not be used, the approved ventilation plan must specify the methods that the operator will use to control spontaneous combustion, as well as accumulations of methane-air mixtures and other gases, dusts, and fumes in the worked-out area. By providing this alternative for the few mines where ventilating worked-out areas with a bleeder system is a hazard to miners, the final rule does not reduce the protection provided by the existing rules.

The final rule does not include the criterion in existing § 75.316–2(f)(3) for precautions to be taken to protect miners when a change is made in the normal air flow through the bleeder system. Any intentional change made in the direction of airflow through a bleeder system is a major ventilation change in the mine. Accordingly, the provisions of § 75.324 apply to such ventilation changes. Section 75.324 specifies precautions to be taken when a ventilation change is made that materially affects the main air current of the mine or any split of the main air current. These precautions include removing electric power from the area, shutting off mechanized equipment, and withdrawing miners from the mine. Additionally, an examination is required after the change has been made.

The final rule also removes existing §§ 75.318 and 75.329–1. These provisions address mining situations that existed on the effective dates of these sections. They are obsolete and no longer applied by MSHA, considering the general requirements for worked-out areas in existing §§ 75.316–2, 75.328, and 75.329. Consequently, it is not necessary to include these sections in the final rule.

Section 75.335 Construction of Seals

The final rule is derived in part from existing § 75.329–2 and establishes construction requirements for seals. Seals isolate the environment within the sealed area from the active workings of the mine.

Existing § 75.329–2 states "that pending the development of specifications for explosion-proof seals or bulkheads, seals or bulkheads may be constructed of solid, substantial and incombustible materials sufficient to prevent an explosion that may occur on one side of the seal from propagating to the other side." Seals must be designed to withstand elevated pressures. The final rule adopts 20 pounds per square inch gauge (psig) as the threshold for determining whether a seal is explosion proof. This threshold is based on the U.S. Bureau of Mines Report of Investigations No. 7581. According to that report, a seal or bulkhead may be considered explosion proof when its construction is adequate to withstand a static load of 20 psig if there is sufficient incombustible material on both sides of the seal to abate the explosion hazard. According to the Bureau's report, with adequate incombustible material and minimum coal dust accumulations, it is doubtful that pressures exceeding 20 psig could occur very far from the origin of the explosion.

The construction requirements in the final rule provide seals that will withstand a static load of 20 psig. Paragraph (a) requires seals to be at least 16 inches thick. When the thickness of the seal is less than 24 inches and the width is greater than 16 feet or the height is greater than 10 feet, a pilaster must be interlocked near the center of the seal. The pilaster must be at least 16 inches by 32 inches. If the seal is at least 24 inches thick, a pilaster is not required regardless of the height or width. New seals must be constructed of solid concrete blocks laid in a transverse pattern with mortar between all joints and must be hitched into solid ribs to a depth of at least 4 inches and hitched at least 4 inches into the floor. Seals not hitched in this manner are unlikely to withstand the pressures of even a relatively small explosion. To further prevent damage to seals in the event of a mine fire or other emergency, seals must be coated on all accessible surfaces with a flame-retardant material that also minimizes leakage.

In developing the final rule, MSHA conducted a series of tests with the U.S. Bureau of Mines to learn whether seals constructed according to the specifications would withstand a 20 psig explosion. In all cases where the seals were built in the manner required by the final rule, the seals withstood the pressure of a 20 psig explosion. Seals not correctly constructed sustained substantial damage or were destroyed.

MSHA concludes that the requirements for seal construction in paragraph (a) are appropriate for providing a significant level of protection for miners in underground coal mines.

As proposed, paragraph (a)(2) permits alternative methods to be used to create seals, as well as alternative materials. This provision allows the development of improved technology for seal construction. The final rule clarifies, however, that the alternative methods or materials may be used only if they can withstand a static horizontal pressure of 20 psig when installed. If the alterative seals can withstand this pressure, they will provide the same protection to miners as seals constructed as specified in the final rule. If alternatives are used, these methods or materials must be specified in the approved ventilation plan.

Also clarifying the proposal, paragraph (a)(2) provides that if alternative construction methods or materials include the use of timbers to create seals, the timbers must be coated on all accessible surfaces with flame-retardant material. As with stoppings, timbers may be less susceptible to damage from geologic stresses in areas where the mine floor is heaving or the roof is caving. Under these circumstances, the timbers must be appropriately coated on all accessible surfaces with a flame-retardant material having a flame-spread index of 25 or less, as tested by ASTM E162–87. This requirement helps to ensure that seals constructed of timbers will not fail quickly in a fire or other mine emergency and will not provide additional fuel to the fire.

An example of an alternative method of seal construction that would be accepted under paragraph (a)(2) is the use of an angle-iron to hitch a seal into the mine floor. Tests conducted by the U.S. Bureau of Mines and MSHA show that proper use of this method of seal construction will result in seals that will withstand a 20 psig explosion. Thus, the use of angle-irons could be approved by the district manager under paragraph (a)(2) instead of the requirement in paragraph (a)(1) that seals be hitched at least 4 inches into the mine floor.

As proposed, paragraph (b) requires a sampling pipe or pipes to be installed in seals so that the atmosphere in sealed areas can be sampled. Excessive levels of methane or other gases behind seals could indicate that the operator needs to take corrective measures. The final rule therefore requires that sampling pipes be installed in each set of seals for a worked-out area.

Paragraph (b)(1) requires sampling pipes to extend into sealed areas for a sufficient distance to obtain a representative sample of the sealed area. This provision is based upon sampling procedures recommended in the 1979 MSHA study, "Interpreting the State of a Mine Fire." The study shows that in sampling situations involving fires behind sealed areas, sampling pipes should extend at least 15 feet toward the fire. This minimum distance also allows representative sampling in non-fire situations. To prevent leakage of methane or other gases through sampling pipes, paragraph (b)(2) requires each pipe to be equipped with a cap or shut-off valve. Also, as proposed, paragraph (b)(3) requires the sampling end of the pipe to be within 12 inches of the mine roof. Because methane is lighter than air, samples must be taken near the mine roof to obtain a representative sample from behind the sealed area. However, the final rule allows the other end of the pipe to be more accessible for sampling.

Water accumulation behind seals is another hazard in sealed areas that could endanger miners. Paragraph (c)(1) requires a corrosion-resistant water pipe or pipes to be installed in seals at the low points of the area being sealed and at all other locations necessary when water accumulation within the sealed area is possible. To provide protection against air leakage into or out of a sealed area, paragraph (c)(2) requires each water pipe to have a water trap installed on the outby side of the seal. The proposal would have required a water pipe or pipes to be installed in all seals. Commenters suggested and MSHA agrees that a water pipe or pipes be installed in seals when water accumulation within the sealed area is possible. Water traps connected to pipes into sealed areas which do not contain water are difficult to maintain full and therefore provide a path for leakage into or out of the sealed area. The final rule reflects the Agency's position on this matter.

Section 75.340 Underground Electrical Installations

The final rule revises existing § 75.1105. The rule establishes requirements to protect miners if a fire originates at underground transformer stations, battery charging stations, substations, rectifiers and water pumps. The final rule does not address shops or compressor stations, which are addressed by §§ 75.343 and 75.344, respectively. Both of these other new rules are also derived from existing § 75.1105.

The final rule, like § 75.1105, requires the specified electrical installations to be located in a noncombustible structure or area. As under the existing rule, this precaution is intended to prevent the spread of a fire originating at the installation to surrounding mine surfaces. In response to the recommendation of a commenter, the final rule defines the term "noncombustible structure or area." This definition is discussed below.

Consistent with the current policy concerning the existing rule on battery charging stations, the Agency does not intend that this rule apply to all track-mounted equipment with integral battery charging units that are powered by storage batteries, or by combination of storage batteries and trolley wire. In these instances, when the storage batteries are charged while the equipment is in motion, the battery-charging units are not considered a station and thus the requirements of paragraph (a) do not apply. An example would be a combination battery/trolley wire powered locomotive. However, if batteries are removed from the machine for charging, the batteries, charging units, and associated equipment must comply with paragraph (a).

The final rule provides an alternative to locating the electrical installation in a noncombustible structure or area. Under this alternative, installations must be equipped with a fire suppression system that meets the applicable requirements of § 75.1107–3 through § 75.1107–16. Fire suppression systems extinguish fires before they spread to the mine roof, floor, or ribs and thus provide the same protection to miners as a noncombustible structure or area for the installation.

The final rule also requires one of three other measures to be used to protect miners from fire hazards that may result from electrical installations. As under existing § 75.1105, paragraph (a)(1) allows ventilating these electrical installations with intake air that is coursed into a return air course or to the surface and does not permit this air to be used to ventilate working places. This measure prevents the delivery of smoke or other products of combustion to the working place by the intake air current. Unlike the existing rule, however, the final rule does not require that the intake air be coursed "directly" to the return. This existing requirement has caused much confusion under the existing rule. The final rule clarifies that the intake air ventilating the electrical installation may not also be used to ventilate active working places. Thus, the air may be coursed into other entries before being coursed into a return if the air is never used to ventilate a working place. Since this air will not be used to

ventilate face areas, the final rule provides the same level of protection as the existing rule.

Instead of ventilating electrical installations with intake air and coursing the air into a return air course as in the previous alternative, paragraph (a)(2) permits the installation to be ventilated with intake air that is monitored for carbon monoxide or smoke with an AMS. If this alternative is used, the AMS must be installed and operated under § 75.351. Monitoring such installations by an AMS has been successfully used in mines where petitions for modification of § 75.1105 have been granted by MSHA. Monitoring the vicinity of installations for smoke or carbon monoxide provides early warning of fire and is a safe alternative to venting the installation to the return. However, because hydrogen, which interferes with currently available CO monitors, is produced during battery charging, monitoring of intake air ventilating the battery charging stations shall be done with sensors not affected by hydrogen. Therefore, battery chargers must be monitored for smoke or one of the other two alternatives specified must be used.

A third alternative, in paragraph (a)(3) requires installations to be ventilated with intake air and to be provided with doors to prevent smoke or fire from leaving the area immediately surrounding the electrical installation. Such doors must have automatic safety features that trigger if the temperature in the fireproof structure reaches 185 °F. These features must also be triggered if a rise in carbon monoxide concentration of 10 parts per million (ppm) above the established ambient level is detected or if the smoke reaches 0.05 per meter optical density. If heat and smoke or CO are detected in the amounts specified, fireproof doors must close, and power to the installation must be deenergized. These measures are necessary, since a rise in temperature could provide a source for methane ignitions or could indicate that a fire has occurred inside the structure. A rise in carbon monoxide concentration of 10 ppm above the ambient level for the area could also indicate a fire. The level for smoke sensors corresponds to the fire alarm level for smoke included in § 75.351.

A fourth alternative that was proposed is not contained in the final rule. This alternative would have permitted the electrical installation to be located in a crosscut between an intake regulator and a return entry if the quantity of intake air passing over the equipment was at least 5,000 cfm, the air passed directly into the return air course, and no part of the equipment extended into the return. As indicated during the public hearings, this alternative was the source of much confusion. Many commenters considered the location proposed for the installation under this alternative to be in the return air course because it would be on the return side of the stopping line. MSHA has reconsidered this proposal in light of the comments and has removed it from the final rule.

Paragraph (b) sets out certain types of electrical equipment that are not required to be addressed by the measures specified in paragraph (a). As proposed, paragraph (b) exempts rectifiers or power centers that move as the working section advances or retreats. These power sources, which are generally used to deliver electricity to face equipment, are routinely moved as mining advances or retreats. Fires originating on section equipment should be detected and extinguished quickly. In addition, exemption of this equipment is also consistent with the Agency's interpretation of existing § 75.1105. To minimize the potential for fires originating from section power centers and rectifiers, paragraph (b) exempts only power centers and rectifiers that are dry-type or that contain nonflammable liquid from the requirements of paragraph (a).

Several commenters questioned application of the proposal to all water pumps. The commenters indicated that it would be impractical if not impossible to protect all pumps as proposed. For certain types of pumps, the commenters stated that since the risk of fire is quite low, it is unnecessary to protect the equipment as specified in the proposal. These pumps include submersible pumps, low horsepower pumps, and those located at or near the working section.

In response to these comments, paragraph (b) also exempts certain types of pumps from the requirements of paragraph (a). These pumps include submersible pumps, permissible pumps and associated permissible switchgear, pumps located at or near the working section that are moved as the section advances or retreats, small portable pumps, and pumps installed in anthracite mines. MSHA believes that these types of pumps do not represent a significant fire hazard and that it is therefore unnecessary to provide a fireproof area, ventilate the equipment to the return, or use the other measures listed in paragraph (a). This exemption is consistent with existing practice and current Agency policy interpretations of the term "permanent pump" in § 75.1105, a term that is not retained in the final rule. The term "permanent pump" has caused confusion about the application of existing § 75.1105. Also, commenters on the proposal correctly indicated that any permissible equipment may be used in a return air course, including pumps, and that it would thus be unnecessary to require pumps to be ventilated by intake air coursed to the return.

Commenters on the proposal also noted that to ventilate pumps to return air courses in anthracite mines, additional crosscuts would need to be made to accommodate all of the locations where pumping of water is necessary. These crosscuts, the commenters indicated, would so weaken slope pillars that the main gangways, which serve as primary escapeways, would be threatened. These commenters also noted that other protective measures, such as automatic closing doors, are not feasible for most anthracite mines, and they requested that the final rule not apply to water pumps used in anthracite mines. MSHA agrees, and paragraph (b)(5) exempts pumps installed in anthracite mines. Because many anthracite mines are extremely wet, pumps must be used to maintain the mines in safe condition. However, MSHA believes that the risk of fire from the pumps in these mines is low since a fire at a pump will be small, is normally extinguished quickly, and is not likely to spread to surrounding mine surfaces.

Consistent with current Agency policy small portable pumps are also excluded from the provisions of paragraph (a). Small portable pumps are easily relocated without the aid of mechanized equipment; capable of being moved frequently; and installed in such a manner to facilitate such movement. Small portable pumps are usually positioned about the mine to dewater local swags or depressions where water accumulates, or, for example, to provide high-pressure spray water for dust suppression on mining equipment.

Section 75.341 Direct-fired Intake Air Heaters

This standard is new and establishes requirements for the use of direct-fired intake air heaters. It provides safeguards against fire hazards and adverse effects on mine ventilation that include precautions designed to prevent contact between persons or combustible materials with intake air heaters.

Intake air heaters are used during periods of cold weather so that the water on surfaces in shafts, slopes, and other mine entries does not freeze. The use of these devices, however, can

increase the level of carbon monoxide introduced into the mine. Improperly installed and maintained heaters can be a fire hazard and also, fuel supplies for heaters can increase the risk of fire or explosion near mine openings.

Under the final rule, if any heater system malfunctions, the heaters affected must switch off automatically. Thermal overload devices must protect the blower motor from overheating, and if a flameout occurs, the fuel supply to the heater must turn off automatically. These safeguards protect against fires occurring in heaters and heater systems that can result in the products of combustion being delivered by the main mine fans into the main ventilating current of the mine.

The proposal would have required a pressure switch or other device to switch off the heaters when the volume of air entering the shaft, slope, or drift where air is being heated is reduced by 10 percent or more when persons are underground. This provision was intended to reduce the potential for air reversal in shafts and other ventilation openings in the mine when the volume of air is reduced. Commenters objected to the proposal stating that the 10 percent threshold may not be appropriate because this change may not significantly affect the ventilation in the mine. Another commenter suggested lowering the threshold to 5 percent because a 10 percent threshold may be too large. Upon reconsideration, the Agency has eliminated the requirement for a pressure switch choosing instead to focus on the requirements of § 75.324 (intentional changes in ventilation systems). When the operation of an intake air heater affects the ventilation in the mine to a degree that could materially affect the safety or health of persons in the mine, the heater should be shut off. The operator may determine whether the shut off should be automatic or manual. In some instances, the operation of an intake air heater without an automatic shut off may result in the heater only being permitted to operate when no one is in the mine.

A commenter on the proposal indicated that several precautions related to the use of intake air heaters that are currently addressed in some mine ventilation plans were not included in the proposed rule. In response, the Agency reviewed ventilation plans addressing intake air heaters and has incorporated certain additional precautions into the final rule.

One precaution in paragraph (d) requires heaters to be equipped with a screen at the inlet to prevent combustible materials from passing over the burner units. Although the final rule retains the proposed requirement for guarding heaters to prevent contact by persons, leaves and other materials can still come in contact with burner units and catch fire, introducing carbon monoxide or fire into the mine.

So that liquified fuel does not leak into the mine, paragraph (e)(1) establishes precautions for intake air heaters that use liquified fuel. Hydrostatic relief valves installed on vaporizers and on storage tanks must be vented. Paragraph (e)(2) also requires liquified fuel storage tanks to be located and protected to prevent this occurrence.

As suggested by a commenter, paragraph (f) requires each heater and its associated components to be examined for proper operation within the first hour of operation following periods of 8 hours or more during which the heater has not operated. Additionally, the heater and its associated components must be examined at least once each shift that the heater operates. To verify that carbon monoxide is not entering the mine and that the heater is burning properly, these examinations must include measurement of the carbon monoxide concentration at the bottom of each shaft, slope, or in drift openings where air is being heated. Instead of having a person taking these measurements, paragraph (f) permits a carbon monoxide sensor to be used. In either case, the heater must be shut down if the carbon monoxide concentration reaches 50 ppm. This level is the current permissible exposure limit for CO for an 8-hour time-weighted average exposure.

Section 75.342 Methane Monitors

This section retains the requirement in existing § 75.313 for approved methane monitors to be installed on all face cutting machines, continuous miners, longwall face equipment, and loading machines. Paragraph (a) includes all other mechanized equipment used to extract or load coal from the face. Consistent with current Agency policy and industry practice, scoops that are used to load coal from inby the last open crosscut must comply with the provision of this section. Scoops which are not used to load coal from inby the last open crosscut are not required to comply with this section. To be approved by MSHA, a methane monitor must meet the minimum requirements specified in 30 CFR part 18.

Constant monitoring of methane during mining activities is an important safeguard against methane ignitions and explosions that could endanger miners. To maximize the effectiveness of monitoring sensors, paragraph (a)(3) retains the existing provision requiring the sensing devices of the monitors to be installed as close to the working face as practicable. A commenter suggested that the final rule should clarify this requirement for longwalls and require the sensing device of the monitor to be installed at the return air end of the longwall face. Monitoring for methane at this location on a longwall face can provide additional protection to miners against the risk of methane accumulations along the face during the mining operation. Another commenter indicated that the sensors should be installed at the tailgate motor area (this would be the location suggested by the other commenter), on the longwall shearing machine, and in the area of the crusher. MSHA agrees with these commenters that the return air end of the longwall face is an appropriate location for a methane sensor on a longwall face. MSHA also agrees that there is a definite safety benefit to requiring an additional sensor on the longwall shearers. In view of these comments, paragraph (a)(2) requires methane to be monitored on longwall mining systems using shearers by a methane monitor with a sensing device installed on the return air end of the longwall face and by an additional sensing device installed on the longwall shearing machine on the downwind side. The sensing device on the longwall shearing machine is required to be on the downwind side as close to the shearing machine as practicable. To provide flexibility in determining the best places on a particular longwall unit to locate the additional sensing device to provide maximum protection to miners, paragraph (a)(2) also allows an alternative location or locations for the sensing device on the shearing machine to be approved in the ventilation plan.

Paragraph (a)(4) retains the existing requirement that monitors be maintained in permissible and proper operating condition to ensure that monitors provide accurate monitoring of methane. In the proposed rule, MSHA requested comments on whether a specific calibration interval should be included in the final rule. Commenters emphasized the need to properly calibrate monitors at regular intervals to maximize the protection that can be provided by these devices. Paragraph (a)(4) includes a provision that requires methane monitors to be calibrated with a known methane-air mixture at least every 31 days, which clarifies the existing requirement in § 75.313–1 for monthly calibration.

In addition to specifying installation and maintenance requirements for methane monitors, paragraph (b)(1) requires a warning signal to be given when the methane concentration in air at any monitor reaches 1.0 percent. In response to comments, paragraph (b)(2) requires the warning signal device of the methane monitor to be visible to a person capable of deenergizing the equipment on which the monitor is mounted. This allows the operator of the face equipment, or other person, to deenergize the equipment at 1.0 percent, if necessary. Paragraph (c) retains the existing requirement for the monitor to deenergize the machine on which it is mounted when the methane concentration in air at the monitor reaches 2.0 percent or when the monitor is not operating properly.

A commenter noted that under existing § 75.313, an authorized representative of the Secretary may require methane monitors to give a warning signal or to deenergize equipment at levels of methane less than 1.0 or 2.0 percent, respectively. The commenter stated that this authority should be retained in the final rule. MSHA's experience with the existing requirements show that the 1.0 and 2.0 percent levels reduce the risk of face accumulations and ignitions of methane and that the lower levels are unnecessary.

Section 75.343 Underground Shops

This section retains the provision in existing § 75.1105 pertaining to underground shops. Unlike the proposal, this section does not address stationary diesel equipment, such as diesel-powered compressors and generators. The final rule addresses diesel compressors in § 75.344. Other types of diesel equipment are addressed in a separate rulemaking establishing requirements applicable to diesels in coal mines (October 4, 1989; 54 FR 40950).

Underground shops must be equipped with automatic fire suppression systems or be enclosed in noncombustible structures or areas and be ventilated with intake air that is coursed directly into a return air course. These precautions are necessary due in part to the nature of the activities which take place in shops, such as cutting and welding, and to the materials that are used in these areas, such as solvents, oils, and greases. In the event of a fire, the products of combustion need to be moved away from areas where persons are working, and the fire must be controlled. Also, during normal operations in shops, vapors, mists, and fumes are produced that must be vented directly into a return air course so that they are kept out of the air used to ventilate areas where persons work.

Section 75.344 Compressors

This new section establishes requirements for compressors in underground coal mines. Improperly used or maintained compressors can present a significant risk of fire. To minimize this hazard to miners, the final rule addresses safety requirements designed to provide detection and suppression of compressor fires.

In the proposal, MSHA indicated its intent to establish requirements for compressors in the final rule and solicited comments on appropriate measures for protecting miners from the fire hazards associated with this equipment. The Agency indicated in the proposed rule preamble that protective measures for compressors specified in the final rule could include precautions similar to those in existing electrical and fire protection standards.

The 1984 Wilberg Mine fire, which was caused by an overheated compressor, shows that compressor fires can have disastrous consequences. The final rule addresses all compressors except those that are component parts of other equipment, such as locomotives and rock dusting machines. Also, the rule does not apply to compressors of less than 5 horsepower. This type of compressor is normally operated while attended and should not have the potential to produce a large fire. Compressor fires on such equipment can be detected and extinguished before they become a hazard to miners.

As with electrical installations addressed in § 75.340, paragraph (a)(1) requires compressors to be located in noncombustible structures or areas. Paragraph (a)(2) requires compressors to be equipped with a heat activated fire suppression system meeting the requirements of §§ 75.1107–3 through 75.1107–16. Paragraph (b) requires compressors to be operated only while the equipment can be seen by a person designated by the operator. This requirement enables action to be taken quickly to minimize hazards to miners if a compressor fire occurs. An alternative to this requirement allows compressors to be operated while unattended, provided that two additional measures are taken to protect miners. One measure requires compressors, like electrical installations, to be ventilated by intake air that is coursed directly into a return air course or to the surface of the mine. Also, the compressor installation, if operated unattended, is required to be equipped with doors that will automatically close to contain the fire and prevent harmful products of combustion from reaching miners. These doors must close when the temperature in the noncombustible structure reaches 165 °F, as well as when the carbon monoxide concentration reaches 10 ppm above the established ambient level for the area, or smoke reaches 0.05 per meter optical density. These revisions respond to the commenter who recommended that compressors should be operated only while attended or while monitored for the products of a fire.

Other measures applicable to all compressor installations include providing portable fire extinguishers for each compressor according to § 75.1100–1(e). Another requirement in § 75.380 prohibits compressors from being installed in the primary escapeway in new development areas. This provision is aimed at providing miners with an escapeway generally free of fire sources. MSHA believes that this precaution, along with the other measures in the final rule, allows safe operation of compressors and provides significant protection to miners from possible compressor fires.

Paragraph (d) specifies that this section of the final rule applies to diesel compressors as well as electrical compressors. The Agency anticipates that this requirement will be removed when the final rule for diesel equipment in coal mines, currently in a separate rulemaking (October 4, 1989; 54 FR 40950), is promulgated.

Section 75.350 Aircourses and Belt Haulage Entries

This section retains existing § 75.326 without substantive change. Unlike the proposal, the final rule does not permit intake air that is coursed through belt haulage entries to ventilate working places. The merits of using "belt air" to ventilate working places in underground coal mines has been debated in the mining community since § 75.326 became effective. The Agency has reviewed the record on this matter, including its Belt Entry Ventilation Report and the comments received during and following the public hearing on the report, and has decided to refer this issue, as well as related issues, to an advisory committee under the provisions of the Act. The Secretary of Labor published a notice of establishment for the advisory committee on June 12, 1991 (56 FR 27034).

Another provision not included in the final rule is the proposed requirement that the air in all belt entries have a velocity of at least 50 fpm. As with the

other issues related to belt air, MSHA is referring this issue to an advisory committee.

Section 75.351 Atmospheric Monitoring Systems

This new section establishes requirements for atmospheric monitoring systems (AMS). The final rule addresses specific situations involving the use of monitoring sensors. Under paragraph (a), an AMS consists of sensors to monitor the mine atmosphere and instruments at a surface location designated by the operator to receive information from the monitoring sensors.

Monitoring systems used under §§ 75.323(d)(1)(ii), 75.340(a)(2), and 75.362(f) of the final rule must perform the functions included in paragraph (a). They must monitor circuit continuity and sensor function and identify at a designated surface location any activated or malfunctioning sensor. To ensure reliability, the AMS must signal the designated surface location when an interruption in circuit continuity occurs or when a sensor malfunctions. The system must also signal when specified levels of gases are detected, depending on the types of monitors used. These signals must be given to the surface and to affected working sections. For example, if carbon monoxide sensors are installed, the system must signal when a sensing device installed under § 75.340(a)(2) detects a carbon monoxide concentration in air at 5 ppm above the established ambient level for that area. Signals must also be given when a device detects a methane concentration exceeding the maximum allowable concentration under § 75.323. The final rule further requires that alarms be activated when the carbon monoxide level at any carbon monoxide monitoring sensor installed under § 75.340(a)(2) reaches 10 ppm above the established ambient level for that area, or when the optical density of smoke at any smoke sensor reaches 0.05 per meter.

The rule does not specify the method which the operator must use to determine the ambient level of carbon monoxide which will be used to set signal and alarm levels under § 75.340(a)(2). Operators may choose to determine this ambient by using a continuous CO monitor or by collecting and analyzing a sufficient number of grab samples to verify an ambient level. The Agency expects that the method used will be sufficient to assure that the ambient level established is neither artificially high nor low. Section 75.371(hh) requires that the ambient level and the method used to determine the ambient level be specified in the approved ventilation plan.

One commenter objected to monitoring systems replacing physical examinations by certified persons. The final rule does not permit an AMS to substitute for any physical examination except as provided in § 75.362(f).

Section 75.362(f) permits an AMS to substitute for the physical check for methane, required at 4-hour intervals in each return split of air between the last working place, or longwall or shortwall face, ventilated by that air split and the junction of that return air split with another air split, seal, or worked-out area. Paragraph (b) requires an AMS sensor, if installed in this return air split, to monitor methane between the last working place, or longwall or shortwall face, ventilated by that air split and the junction of that return split with another air split, seal, or worked-out area. When auxiliary fans and tubing are used, the sensor must be installed outby the auxiliary fan discharge. Use of an AMS in this instance permits the methane liberated at the face during the mining process to be monitored continuously as opposed to once each 4 hours.

Paragraph (c) addresses AMS monitoring of underground electrical installations for the products of combustion. Under § 75.340(a)(2), transformer stations, battery charging stations, substations, rectifiers, and water pumps may be monitored for CO or smoke instead of coursing the intake air ventilating the structure or area housing these installations into a return air course. If this alternative is used, at least one CO or smoke sensor must be installed to monitor the intake air ventilating the installation. The sensor must be located at least 50 feet and no more than 100 feet downstream from the installation in the direction of airflow.

Paragraph (d)(1) requires that while persons are underground, a person designated by the operator must be present at the surface of the mine to see or hear the signals of the detection system. This person must have access to two-way communication with persons on working sections and with other persons having identifiable duty stations. Also, a map showing underground monitoring system components and their locations must be posted at the surface location so that information can be relayed quickly to and from the working places during an emergency.

Paragraph (d)(2) specifies that if a signal from any AMS sensor is activated, the monitor producing the signal must be identified, an examination must be made to determine the cause of the activation, and appropriate action must be taken.

So that sensing devices can detect gases at the specified levels, paragraph (e) requires each carbon monoxide sensor to be capable of detecting carbon monoxide in air at a level of ±1 ppm throughout the operating range, and each smoke sensor must be capable of detecting the optical density of smoke within specified accuracies. Methane sensors must be able to detect 1.0 percent methane, with an accuracy of ±0.2 percent.

To verify the accuracy of CO sensors, paragraph (f) requires each carbon monoxide sensor to be calibrated with a known concentration of CO and air sufficient to activate an alarm. Similar calibration requirements are specified for methane and, to verify the performance of smoke sensors, paragraph (f)(2) requires each smoke sensor to be functionally tested. Calibration of CO and methane sensors, and tests of smoke sensors are required at least every 30 days.

Paragraph (g) requires that components of monitoring systems used in areas where permissible equipment is required to be used must be intrinsically safe. Areas where permissible equipment must be used include return air courses.

To verify the performance of the detection system and provide data regarding trends in the mine, paragraph (h) requires that a record be made when a signal device or alarm of an AMS is activated. This record must include the date and time and methane, smoke, or carbon monoxide concentration at the sensor producing the signal, and the reason for its activation. Records must be retained for 1 year and must be made available to MSHA inspectors and the miners' representative.

Section 75.352 Return Air Courses

This section prohibits placing belts in return air courses. It clarifies existing § 75.328 which requires separation of return air courses from belt haulage entries. Under the final rule, mine operators wishing to use the belt entry as a return air course will be required to petition the Agency for modification of the standard. Through the petition for modification process, MSHA can make a mine-by-mine assessment of the safety and health impact of locating the belt in the return air course.

Commenters questioned the need to prohibit use of the belt entry as a return air course and suggested that the final rule permit this practice with appropriate requirements for continuous monitoring of the belt entry. The Agency

does not agree that the use of the belt entry as a return air course should be permitted for all mines. Allowing return air to pass over a moving belt conveyor, particularly in mines where methane liberation is high, can increase the likelihood of an explosion caused by a spark along the conveyor.

The Agency has granted a small number of petitions for modification of existing § 75.326 to allow the belt entry to be used as a return air course in some mines when the mine has demonstrated using the belt entry as a return is necessary due to a diminution of safety caused by compliance with the existing standard. In granting these petitions, MSHA specifies uses of continuous methane and carbon monoxide monitoring and other precautions to protect against the risk of ignition or explosion caused by conveyor belts operated in return air courses.

Based on the Agency's experience with these petitions, the petition for modification process under section 101(c) of the Act is the appropriate procedure for making this determination on a mine-specific basis. This conclusion is consistent with the findings of MSHA's Belt Entry Ventilation Report. That report cited "valid reasons" for separating return air courses from belt haulage entries. Because return air leaving a working face usually contains float dust, respirable dust, and methane, the report states that these contaminants are properly directed to return entries where activity is limited and ignition sources are not present. Thus, the report concludes, there is "no reason" to allow the return to be used as a belt haulageway without other compelling safety considerations.

Section 75.360 Preshift Examination

The final rule is derived from existing §§ 75.301–3, 75.303, and 75.303–1 and requires a preshift examination to be made by a certified person before any working shift begins. Like the current standard, the final rule requires that a certified person who has been designated by the operator conduct the preshift examination within 3 hours before the beginning of any shift and before any person on the oncoming shift, except certified persons conducting required examinations, enters any underground area of the mine.

A commenter suggested deleting the reference in the proposal to "3 hours before the beginning of any shift" because some mines have adopted "innovative and overlapping shift schedules" and that as written the proposal would require continuous examination. The Agency has not deleted the reference because it is a current requirement that is well understood throughout the industry. However, it is not the Agency's intent that the preshift be a continuous examination without a beginning or an end. Rather if the mine uses regular shifts that are longer than 8 hours in length, the preshift examination is good for the entire length of the shift. Those persons who start their work shift later than the normal shift start time do not need an additional preshift examination during the remainder of that shift but a preshift will be required if they are to stay in the area past the end of the shift during which they entered the mine or area. Also, in those instances where staggered work shifts are used, the Agency expects that areas of the mine where persons are scheduled to work or travel be examined within 3 hours of persons entering the area. Another examination is not required until 8 hours or the normal length of the shift (for example a 9 or 10 hour shift) has elapsed.

The preshift examination is an accepted safety practice in the industry and is a primary means of determining the effectiveness of the mine's ventilation system and of detecting developing hazards, such as methane accumulations. Therefore, as under the existing standard, paragraph (b) requires the examination to include an examination of underground areas for hazardous conditions and tests for methane accumulations and oxygen deficiency. The person conducting the preshift examination must also determine whether the air is moving in its proper direction. Devices used to make measurements and tests during the preshift and other examinations are those meeting the applicable requirements of § 75.320.

The final rule clarifies the areas where the preshift examination is required. Generally, areas where a preshift examination is necessary are those areas in which persons will work or travel during the oncoming shift and other locations where potential hazards can develop that are likely to threaten the safety of miners in active working areas. An examination of these areas before a shift begins allows miners on the oncoming shift to be notified if hazards exist and allows corrective actions to be taken. In addition to methane accumulations and oxygen deficiency, other hazards that can be detected during the preshift examination are loose roof or ribs, water accumulation that affects air courses or escapeways, electrical hazards from trolley wires, and fire hazards from damaged or improperly operating belt conveyors.

Although the final rule does not retain the provisions in the existing rule that specifically instruct the preshift examiner to examine and test the roof, face, and rib conditions in the working section, including accessible falls, the final rule is designed to ensure that all such hazards will be detected and corrected as a result of the preshift examination.

A commenter suggested that all idle areas of the mine should be examined during the preshift examination. The commenter stated that explosions have occurred when miners were sent into idle areas of coal mines that had not been preshifted. MSHA disagrees that all idle areas need to be preshifted. There is no need to require areas of the mine where persons are not scheduled to work or travel to be examined. As discussed more fully below, the supplemental examination required by § 75.361 permits the certified person to perform examinations of his or her own working areas and requires a supplemental examination to be made by a certified person within 3 hours prior to any person's entering any underground area in which a preshift examination for that shift has not been made.

Paragraph (b) indicates the specific locations where a preshift examination is required. As with the existing rule, the preshift examination must show that areas where persons work or travel in the mine are free of hazards before miners enter these areas. To provide safe travel in and out of the mine, both to working sections and other designated working areas, paragraph (b)(1) requires all roadways and track haulageways to be examined, as well as all other areas where persons are scheduled to work or travel during the oncoming shift. As under the existing rule, belt conveyors that are used to transport persons on the oncoming shift must be examined. The final rule clarifies the existing provision and specifies that the examination includes the entries where belt conveyors are located as well as the belt conveyors. A commenter suggested that all conveyor belts be preshifted. The final rule does not include this suggestion. Rather, it requires an on-shift examination, by a certified person, of belt conveyor haulageways in which belts are operated.

The preshift examination must also include all working sections where persons are scheduled to work during the oncoming shift and all areas where mechanized mining equipment is being

installed or removed if persons are scheduled to work in the area during the oncoming shift. Included in this examination of working sections and areas where equipment is being installed or removed are working places and ventilation controls and approaches to worked-out areas on those working sections or in these areas.

The specific reference in the final rule requiring preshift examination of areas where equipment is being installed or removed has been added to clarify the existing rule. The Agency has always considered these areas to be subject to the requirements of the preshift examination; however, an investigation following an explosion at the William Station Mine indicated that some confusion existed on this issue.

Other areas that require a preshift examination are approaches to worked-out areas in active workings and seals along intake entries where intake air passes through or along these entries on its way to a working section. In response to comments, the final rule clarifies the proposed requirement of a preshift examination of seals along intake air courses. Such seals must be examined where intake air passes by such seals to ventilate an active working place. Seals located along return air courses or seals along intake air course where the air passing by these seals is not used to ventilate a working section must be examined during the weekly examination required by § 75.364. Additionally, in response to comments, the final rule requires that entries or rooms driven more than 20 feet off an intake air course without a crosscut or more than 2 crosscuts off an intake air course without permanent ventilation controls to be preshifted if intake air passes through or by these entries or rooms to a working section where anyone is scheduled to work during the oncoming shift. The proposal would have required a preshift examination of all entries and rooms driven off intake air courses regardless of depth or ventilation controls used. MSHA has reconsidered this proposal and the final rule clarifies the requirement.

A new requirement specifies that a preshift examination must be made in underground areas where unattended diesel equipment is turned on during a shift or where trolley wire or trolley feeder wires are energized during the oncoming shift. Examination of these areas as part of the preshift can protect against fire and other hazards. In response to comments, the final rule does not require preshifting of all electrical installations as the proposal did. Commenters pointed out that such a requirement would result in preshifting of permissible equipment and pumps where the hazard is small. The Agency agrees, and has narrowed the final rule to include only those installations which pose a significant hazard. Under paragraph (a), if persons are scheduled to work in the area of an electrical installation, the area would require a preshift examination.

Paragraph (c) requires the preshift examination to include a determination of the air volume at certain locations where determinations can be made whether air is reaching working places at required levels. Determinations of the volume of air must be made in the last open crosscut of each set of entries or rooms in each working section and in each area where mechanized mining equipment is being installed or removed in the line of pillars containing the permanent stoppings that separate the intake air courses and the return air courses. If pillars are being extracted or in areas where pillar extraction has been completed and the mining equipment is being removed, the specific location for the measurements made at the intake end of the pillar line depends on whether a single split of air is used to ventilate the pillar line or a split system is used. If a single split of air is used, the measurement must be taken in the intake entry or entries immediately outby the first open crosscut outby the line of pillars being mined. Also, like the existing rule, the final rule requires this measurement to be made in the intake entry furthest from the return air course. Measuring the air at this location helps to ensure an accurate reading of all of the air ventilating the pillar line. In sections where a split system is used, the measurement must be taken in the intake entry of each split immediately inby the split point.

On a longwall or shortwall section, the volume must be determined in the intake entry or entries immediately outby the face. To determine that a sufficient velocity of air is moving across the entire face, two additional velocity measurements also must be made along the longwall face. The locations for these additional measurements must be at least 50 feet and no more than 100 feet from each end of the face; that is, one velocity reading at the headgate end and one at the tailgate end. The specific locations where these velocity measurements will be made is required to be specified in the approved ventilation plan.

During the installation or removal of longwall or shortwall mining equipment, the volume must be determined in the intake entry or entries immediately outby the area where the equipment is being installed or removed.

Paragraph (d) incorporates existing provisions that authorize MSHA to expand the normal scope of the preshift examination based upon the conditions at particular mines. Under paragraph (d), the preshift examination may include other areas of the mine designated by the district manager. Also, as in the existing rule, the district manager can require the preshift examination to include an examination for other hazards. However, as proposed, the final rule does not include a provision authorizing expansion of the preshift examination to include examination for violations of mandatory standards. Most "hazards" are violations of mandatory standards. MSHA believes that authorizing the district manager to require the preshift examination to include examination for other hazards ensures that preshift examinations are tailored to provide the necessary protection for miners. Also requiring the preshift examiner to look for all violations regardless of whether they involve a hazard could distract the examiner from the more important aspects of the examination. The preshift examination is designed to concentrate the examiners efforts in those areas where they are most suitably applied.

Paragraph (e) incorporates a comment suggesting that preshift examiners should post a "danger" sign in areas of the mine that are hazardous for work or travel. The proposed rule would have required that a "warning" sign be posted conspicuously where a hazard exists so that persons entering that area could see it. A commenter suggested that the word "danger" should be used, as it has an accepted meaning in the industry, especially among miners. As proposed, the final rule does not permit any person to enter any area while a danger sign is posted unless the person is designated by the operator to correct the hazardous condition.

Unlike existing § 75.303, the final rule does not specify the posting of danger signs where violations of mandatory standards exist. MSHA recognizes that "technical" violations of mandatory standards may not immediately endanger miners but where such violations constitute hazards, danger signs must be posted.

The final rule revises existing recordkeeping requirements for preshift examinations to lessen paperwork burdens without lessening the protection provided miners. For each area examined on a preshift examination, paragraph (f) requires the examiner to certify by initials, date, and time that the

proper examination was made. Paragraph (g) requires a record to be made in a book provided for that purpose of hazardous conditions and their locations, even if these conditions have been corrected during the preshift examination. Commenters stated that a record of all hazards found during the examination is necessary to enable the examiner to double-check, during subsequent examinations, areas where problems have occurred. The final rule requires these records to be retained at a surface location at the mine for at least 1 year.

Records may be made by persons other than the person making the preshift examination, so that certified persons conducting the examinations can remain underground to do other tasks. However, the results of the examination must be recorded before any person, other than certified persons conducting required examinations, enters any underground area of the mine. Also, the certified person who conducted the examination must verify the results of the examination by initials and date upon returning to the surface of the mine. Additionally, consistent with current practice, miners may enter the mine prior to the foreman countersigning the record, provided the required examination has been completed.

Paragraph (g) retains the existing requirement that mine foremen countersign records of preshift examinations. Commenters indicated that this requirement is necessary to verify the accountability of the operator for hazardous conditions in the mine and to ensure that such conditions are corrected promptly. Because the operator is ultimately responsible for all hazardous conditions underground, the existing requirement to countersign the daily reports of preshift examiners is not unduly burdensome. A commenter suggested that the requirement that the superintendent or the assistant superintendent of the mine also countersign the daily reports be retained. This suggestion has not been adopted. The Agency has chosen instead to require countersigning by the person most knowledgeable of the day to day operation of the mine and the person who is required to be certified, the mine foreman. In many instances, the mine superintendent is not a certified person and the mine foreman is held ultimately responsible for the operation of the mine by many state laws. The Agency does not believe that not requiring this additional countersigning diminishes the level of protection afforded the miner.

Section 75.361 Supplemental Examination

This section is derived from existing §§ 75.303 and 75.314 and requires a certified person to examine for hazardous conditions before any person enters an area of the mine that has not been preshift examined. This supplemental examination is not required before certified persons conducting preshift or other examinations required by the final rule enter these areas.

Existing § 75.303(b) prohibits persons from entering any underground area, except during any shift, unless a preshift examination has been made within the previous 8 hours. Thus, if a shift lasts longer than 8 hours persons on that shift are permitted to enter areas after 8 hours if an examination of the area has been made for that shift. No person on a subsequent shift, however, may enter the area after 8 hours, until a preshift examination of the mine has been made for that shift. Existing § 75.314 addresses areas where no preshift examination has been made and prohibits anyone from entering an idle or abandoned area unless an examination for methane, oxygen deficiency, and other hazards has been made in the area within the previous 3 hours.

The final rule combines existing §§ 75.303(b) and 75.314 and requires a certified person to examine for hazardous conditions, determine whether the air is traveling in its proper direction and at its normal volume, and test for methane and oxygen deficiency. As under existing § 75.303(b), these precautions must be taken before persons enter areas where a preshift examination under § 75.360 has not been made for that shift. Thus, if an area has been preshift examined for that shift, no supplemental examination is required for persons on the shift who are assigned to work or travel to that area during the shift. The final rule requires a supplemental examination to be made within 3 hours before any person on any shift enters an area that has not been preshift examined, or within 3 hours before any person on a subsequent shift enters an area that has been preshift examined only for a previous shift. The final rule ensures that all remote areas of the mine are examined before persons are sent to work or travel in these areas.

The proposal would have expanded the existing exemption to not only include qualified pumpmen but to also include qualified belt mechanics. This would have permitted pumpmen and belt mechanics to make supplemental examinations for themselves in areas that have not been preshift examined during the previous 8 hours. Commenters questioned this exemption, stating that only certified persons are capable of determining that remote areas are safe for work. MSHA agrees that certified persons are best able to examine work areas for hazards. Also, the Agency does not believe that elimination of the existing exemption for pumpmen is burdensome because it is currently a common practice in the industry for pumpmen to be certified. Therefore, the final rule requires all persons conducting supplemental examinations to be certified.

Paragraph (b) requires persons performing the supplemental examination to certify by initials and date that the examination was made at each working place examined. This certification is like that required under § 75.360 for the preshift examination. In areas outby working sections, the certified person is required to certify by initials, date, and time at a sufficient number of locations to show that the entire area has been examined. Commenters suggested that the results of the supplemental examination, like the preshift, should be recorded. However, MSHA anticipates that under this rule, supplemental examinations will be conducted during working shifts just before persons are sent to perform unscheduled tasks in remote areas that have not been preshifted and often when accompanied by the certified persons who will examine such areas. Therefore, requiring a record to be made serves no additional safety benefit. However, under § 75.360, a record must be made if the certified person conducts a preshift examination of the area for persons on the oncoming shift at the same time as the supplemental examination.

Section 75.362 On-shift Examination

The final rule is derived from existing §§ 75.301–3, 75.303, 75.303–1, 75.304, 75.307, 75.307–1, 75.309 and 75.309–2 that establish requirements for on-shift examinations. Like the preshift examination, the on-shift examination includes an examination for hazardous conditions, tests for methane and oxygen deficiency, measurement of air velocity and determination of air volume at specified locations, and a determination that the air is moving in its proper direction. However, paragraph (a) of this section requires on-shift examinations only on sections where coal is produced or where mechanized mining equipment is being installed or removed during the shift.

Like the existing rule, the final rule requires a certified person to examine

each working section where work is done during each shift that coal is produced. Because the mining environment changes constantly during coal production, this examination verifies that hazards have not developed on the section or in the area since the area was preshift examined and includes tests for methane and oxygen deficiency. The final rule does not retain the existing provision requiring the on-shift examination to be conducted more often if necessary for safety; but the final rule does not restrict operators from conducting more frequent examinations to ensure the safety of miners.

A commenter suggested that the final rule specify that hazardous conditions found during the on-shift examination be corrected immediately. Also, the commenter recommended retention of the specific language of existing § 75.304 that requires the operator to withdraw miners if an imminent danger is found during the onshift examination, except for persons referred to in § 104(c) of the Act. MSHA agrees, because the intent of the rule is to require an on-shift examination to be made so that developing hazards can be detected and corrected without exposing miners to safety risks. In all cases, where such hazards constitute an imminent danger, MSHA believes that miners should be withdrawn. Accordingly, paragraph (a)(2) requires all hazardous conditions to be corrected immediately, and if such conditions constitute an imminent danger, persons are to be withdrawn from the area affected to a safe area until the hazard is corrected, except those persons referred to in § 104(c) of the Act.

Paragraph (b) is a new provision derived from existing § 75.303. It requires an on-shift examination, by a certified person, of belt conveyor haulageways in which belts are operated. Examination of belt conveyors reduces the potential hazards associated with operating belts. Paragraph (b) requires the entire belt conveyor to be examined during production shifts. Like the preshift examination required for conveyor belts used to transport persons, the Agency intends that this examination include an examination of both the conveyor belt and the entry in which it is located. Because this examination is required to be made by a certified person, the final rule allows the on-shift examination to satisfy the requirements of the preshift examination of the belt conveyors that are used to transport persons during the oncoming shift, provided that the examination is made within 3 hours preceding the start of that shift. A commenter objected to this provision. However, allowing these examinations to be conducted at the same time is consistent with accepted procedures for existing preshift and on-shift examinations and eliminates a potentially duplicative examination requirement without reducing the safety protection provided to miners.

Under existing §§ 75.303 and 75.304, examinations are required during each "coal-producing shift." The term "coal-producing shift" was defined in existing § 75.304–1 as "* * * any shift during which one or more of the following operations are performed: Cutting, blasting, or loading of coal, or the hauling of coal from the face areas, regardless of whether the coal is dumped at a tipple." MSHA has interpreted this definition to include activities performed in a working place that are related to the extraction and transportation of coal from the face, generally using mechanized mining equipment expressly for the purpose of removing coal from the face during the mining cycle. Although the final rule does not use the term "coal-producing shift," MSHA intends to interpret the words "where coal is produced" in the final rule consistent with the Agency's interpretation of "coal-producing shift." Thus, the final rule continues to require an on-shift examination on a section during any shift where mechanized mining equipment is used to remove coal from face areas during the mining cycle or for the purpose of completing a mining cycle. This includes the belt examination required by paragraph (b). A new provision in the final rule requires an on-shift examination in areas where mining equipment is being installed or removed during the shift, regardless of whether coal is produced on the shift. Like the requirement under § 75.360, the specific reference in the final rule requiring on-shift examination of areas where equipment is being installed or removed has been added because the Agency has always considered frequent examinations of these areas to be important to ensuring the safety and health of miners.

Paragraph (c) requires certified persons conducting on-shift examinations to take the air measurements at the same locations where air measurements are required during the preshift examination. This provides an additional check of the mine's ventilation system and verifies that ventilation changes in the mine during the production process have not occurred. Reduced volume or velocity of air during the shift can contribute to increased levels of respirable dust and the occurrence of methane accumulations or oxygen-deficient atmospheres.

Consistent with the existing rule and in response to a commenter, immediately before equipment is taken into, operated or energized in working places, paragraph (d) requires a qualified person to test for methane. These tests must be taken at the last permanent roof supports or, when longwall or shortwall mining is used, at the headgate and tailgate. Tests closer to the working face using extendable probes or other acceptable means may be required to be specified in the approved ventilation plan. Methane tests verify that equipment can be safely energized in the working place so that miners are protected from methane ignitions or explosions. In response to comments, paragraph (d)(2) retains the existing requirement that additional tests for methane be made at 20-minute intervals during the operation of equipment. Commenters from all segments of the mining community indicated that the existing requirement which specifies that qualified persons test for methane at intervals of not more than 20-minutes if electrically operated equipment is energized is not burdensome and provides adequate assurance during the operation of equipment that methane is not accumulating in face areas during production. In response to another comment, the final rule specifies that the locations for methane checks are in working places at the last row of permanent supports, unless tests are made closer to the working face using extendable probes or other acceptable means. As the commenter indicated, such probes are readily available and enable readings to be taken close to the face without exposing miners to unsupported roof. The final rule also clarifies where methane checks must be made on longwall or shortwall mining sections.

As discussed under § 75.331, paragraph (e) retains the existing requirement that when auxiliary fans and tubing are used, the fan is to be inspected frequently.

As proposed, paragraph (f) retains the existing provision requiring a test for methane every 4 hours in each return air split on each working section. This provision allows the operator to determine whether methane levels in air returning from the face are within required levels. The tests must be made by a certified person between the last working place, or longwall or shortwall face, ventilated by that air split and the junction of that return air split with

another air split, seal, or worked-out area. Monitoring by an AMS may be substituted for the 4-hour test by a certified person. Additionally, the final rule clarifies that if auxiliary fans and tubing are used to provide face ventilation, the test must be made at a location outby the auxiliary fan discharge.

Paragraph (g) reduces and simplifies existing recordkeeping requirements. Certified persons making on-shift examinations must certify by initials, date, and time that the examinations were conducted and each working place examined. Also, a record of hazardous conditions and their locations must be made in a book kept for this purpose. The final rule retains the existing requirement that mine foremen countersign on-shift examination records. A commenter suggested that the requirement that the superintendent or the assistant superintendent of the mine also countersign the on-shift reports be retained. This suggestion has not been adopted. The Agency has chosen instead to require countersigning by the person most knowledgeable of the day-to-day operation of the mine and the person who is required to be certified, the mine foreman. In many instances, the mine superintendent is not a certified person and the mine foreman is held ultimately responsible for the operation of the mine by many state laws. The Agency does not believe that not requiring this additional countersigning diminishes the level of protection afforded the miner.

Paragraph (h) requires these records to be retained at a surface location at the mine for at least 1 year and made available for inspection by authorized representatives of the Secretary and representatives of the miners.

The final rule does not retain the proposed requirement that a qualified person test for methane along each belt conveyor haulageway where a belt is operated during the shift. The proposal would have required these tests to be conducted during the shift at intervals not exceeding 4 hours and would have been in addition to the on-shift examination of belt conveyors required by paragraph (b). Several commenters objected to the proposal, indicating that such a new requirement would be unduly burdensome, particularly in larger mines with several miles of belt conveyors, and especially in light of the preshift and on-shift belt examination requirements. After considering these comments, MSHA agrees that a test for methane along the belt conveyor is not necessary in addition to the preshift and on-shift exams. Under § 75.360, belt conveyors that are used to transport persons, and the entries in which the belts are located, are required to be preshift examined, as well as all belts where persons are scheduled to work during the oncoming shift. Also, during each production shift, an on-shift examination of the belt haulageway is required by § 75.362. A commenter suggested that existing § 75.320 requiring methane tests prior to blasting be retained. As noted in the proposal, this section is addressed under subpart N, explosives and blasting. It appears as § 75.1324, methane concentration and tests in 30 CFR. Therefore, the final rule does not adopt the suggestion of the commenter that the language be retained in subpart D.

Section 75.364 Weekly Examinations

This section is derived from existing §§ 75.305, 75.308, and 75.316 and requires a weekly examination for worked-out areas and for locations where hazardous conditions could inhibit the mine's ventilation system or otherwise endanger miners.

Paragraph (a)(1) requires a weekly examination for all unsealed worked-out areas where no pillars have been recovered. This examination includes travel by a certified person to the point of deepest penetration in the worked-out area, as well as measurements of methane and oxygen concentration and tests to determine if the air is moving in its proper direction. Alternatives to weekly travel may be specified in the approved ventilation plan, allowing worked-out areas to be effectively evaluated without subjecting the examiner to travel in areas where travel is difficult or where bad roof or other unsafe conditions in worked-out areas exist.

Paragraph (a)(2) similarly requires weekly examination of bleeder systems used to ventilate areas where pillars have been fully or partially extracted. Paragraph (a)(2) also requires measurements of methane and oxygen concentration and tests to determine if air is moving in its proper direction, at locations where air enters the worked-out area and immediately before it enters a return split of air. Also, like existing ventilation plan approval criteria that require bleeder entries to be maintained safe for weekly travel and examination, the final rule requires weekly travel of bleeder entries in their entirety. Travel in the bleeder entries can sometimes be hazardous to the examiner. As in the existing criteria, the final rule specifies the alternative of weekly travel or to locations approved in the ventilation plan where measurements can be made to determine the effectiveness of the bleeder system. Measuring methane and oxygen concentrations and determining the direction of air flow at these locations allow the performance of the ventilation system in worked-out areas to be assessed while minimizing the exposure of persons to hazards while traveling bleeders.

The proposal would have permitted the alternative of continuous monitoring by an AMS instead of weekly examination by a certified person for both worked-out areas where no pillars have been removed and for bleeder entries. A commenter objected to this alternative because it was felt that AMS will not alert the operator of deteriorating conditions in the area. Upon reconsideration, the alternative permitting this examination by an AMS has not been included in the final rule because the Agency agrees that although AMS would be capable of providing information relative to the status of the ventilation in the area, current technology does not permit the AMS to warn the operator of all potential problems that a physical examination may discover.

Paragraph (b), like existing § 75.305, requires an examination for hazardous conditions at certain locations in the mine. The final rule does not specifically indicate that this examination must verify compliance with mandatory health or safety standards as under the existing rule, but the weekly examination for hazardous conditions conducted under the final rule inherently includes a determination of compliance with mandatory standards since ordinarily most hazardous conditions in a mine would result from a violation of a safety or health standard. Requiring the examiner to look for all violations regardless of whether they involve a hazard could distract the examiner from the more important aspects of the examination. This examination, like other examination required by the final rule, is designed to concentrate the examiners efforts in those areas where they are most suitably applied.

The weekly examination for hazardous conditions includes an examination of intake and return air courses. Consistent with existing § 75.305 and in response to a commenter, the weekly examination of return air courses must include at least one entry of each return air course so that the entire air course is travelled. Travelling return air courses in their entirety during the weekly examination allows the examiner to determine if hazardous conditions are developing in

the returns that may potentially impede travel or mine ventilation.

Paragraph (b)(1) requires at least one entry of each intake air course to be examined weekly. Additionally as proposed, escapeways must be travelled in their entirety during the weekly examination under paragraph (b)(5). Weekly examination of escapeways in their entirety enables verification that the escapeways are free of obstructions that could impede escape from the mine during an emergency.

A weekly examination must also be conducted at each seal along return and bleeder air courses and each seal along intake air courses not examined as part of the preshift examination. An examination at these locations helps verify that the seals have not been damaged or displaced during the previous 7 days. Damaged and displaced seals can greatly lessen the effectiveness of the mine's ventilation system, posing a serious threat to the safety of miners.

Paragraph (b)(3) is a new provision requiring a weekly examination and travel of at least one air course, in its entirety, on the tailgate side of each longwall mining section. Derived from MSHA's two-entry task force recommendation No. 1, this requirement enables the weekly examiner to verify that no conditions on the tailgate side of the longwall exist that impede ventilation or egress by persons. Ground failure or any other blockages in tailgate entries could require additional ventilating pressures to overcome the increased resistance caused by the obstruction in order to restore longwall ventilation to within specified levels. As the two-entry task force report indicates, any restriction in tailgate entries severe enough to prohibit travel may present a serious impairment to proper longwall ventilation.

Paragraph (b)(6) requires that a weekly examination be made on each working section that has not been preshift examined during the previous 7 days. A commenter suggested that all idle areas of a mine should be examined during the preshift examination. MSHA disagrees. There is no need to require areas of the mine where persons are not scheduled to work or travel to be preshift examined. As previously discussed, the supplemental examination required by § 75.361 permits a certified person to perform examinations of his or her own working areas and requires a supplemental examination to be made by a certified person before anyone enters an underground area in which a preshift examination for that shift has not been made. However, MSHA does agree that working sections that are set up to mine coal should be examined at least every 7 days and paragraph (b)(6) has been included to require this examination.

Paragraph (c) is derived in part from existing § 75.305 and from the requirements in existing § 75.306 for a weekly ventilation examination. The final rule, like these provisions, specifies measurements and tests at certain locations in the mine to allow weekly verification of the performance of the mine's ventilation system. Weekly measurements and tests at the locations specified in the final rule allow ventilation deficiencies to be identified and corrected.

Like existing § 75.306, paragraph (c) requires a determination of the volume of air entering the main intakes and in each intake split. The Agency intends that these determinations be made at locations where the effectiveness of the ventilation system in providing air to working areas can be determined. These locations would include: (1) At the bottom of each intake shaft or slope and in each drift opening so that the total volume of air entering the shaft, slope or drift can be determined, (2) in each split of the main intake, including splits into submains, and (3) in each split of the main intake or major split of the main intake which is used to supply air to working sections and areas where equipment is being installed or removed. Not included in this requirement are minor splits of air used to ventilate electrical installations, pumps, shops, or compressors.

Paragraph (c) also requires measurements of air volume and testing for methane in the last open crosscut in any pair or set of developing entries or rooms, in the return of each split of air immediately before it enters the main returns, and where the air leaves the main returns. A test for methane also must be made in each return air course immediately outby each set of seals. The locations for these measurements and tests are retained from existing §§ 75.305 and 75.306 and together provide an effective weekly check of the mine's ventilation system.

As required for on-shift examinations, paragraph (d) requires immediate correction of hazardous conditions found during the weekly examination. Also, if the hazardous condition presents an imminent danger to miners, all persons must be withdrawn to a safe area, with the exception, as under existing § 75.305, that withdrawal does not include persons referred to in § 104(c) of the Act.

Consistent with existing practice and as proposed, paragraph (e) allows any portion of the weekly examination to be conducted by a certified person during the preshift or on-shift examinations.

Paragraph (f) retains, with clarifying changes, the existing provision that the weekly examination is not required for any 7 day period that no one enters the mine. The final rule also retains the existing prohibition from anyone other than certified persons from entering any underground area of the mine if, within the previous 7 days, a weekly examination has not been made. Consistent with existing Agency policy, the entrance of examiners or other certified persons, into the mine for the purposes of examination or patrol does not require a weekly examination.

Paragraph (g) requires that persons making the examinations certify that they have examined an area by placing their initials, date, and time at enough locations to verify they have examined the entire area. Paragraph (h) retains existing recordkeeping requirements for weekly examinations and requires a record of hazardous conditions, their locations, and the action taken to correct the condition to be made. Also the results and locations of air and methane measurements made during the weekly examination must be made. This record must be retained for 1 year at a surface location. Also, like the records of the preshift and on-shift examinations, this record is required to be countersigned by the mine foreman. MSHA expects that the mine foreman will review this record as well as the records of the preshift and on-shift examinations before countersigning.

A commenter suggested that the requirement that the superintendent or the assistant superintendent of the mine also countersign the weekly reports be retained. This suggestion has not been adopted. The Agency has chosen instead to require countersigning by the person most knowledgeable of the day to day operation of the mine and the person who is required to be certified, the mine foreman. In many instances, the mine superintendent is not a certified person and the mine foreman is held ultimately responsible for the operation of the mine by many state laws. The Agency does not believe that not requiring this additional countersigning diminishes the level of protection afforded the miner.

Section 75.370 Mine Ventilation Plan Submission and Approval

This section revises and consolidates ventilation plan approval and review procedures in existing §§ 75.316 through 75.316–2. It retains the existing requirement that each mine be ventilated according to a ventilation

plan developed by the mine operator and approved by MSHA's district manager. Ventilation plans approved by MSHA have been used effectively not only to address routine planning needs for the mining industry but address unique mining conditions on a mine-by-mine basis.

Paragraph (a)(1) states that the approved ventilation plan must consist of two parts. The first part, the ventilation plan contents detailed under § 75.371, is to contain information that will be subject to approval by the district manager. The second part, detailed under § 75.372 mine ventilation map, contains information which is critical to the plan approval process but is not subject to approval by the district manager. This information would include physical characteristics of the mine such as coal contours, the extent of the mine workings, other mine workings on the mine property that are located in the same coalbed, and other information that will assist the district manager in the approval process. MSHA recognizes that some of the information required to be submitted under § 75.371 is best shown on a map. Rather than require additional maps, this information may be shown on the § 75.372 map. When shown on the § 75.372 map, only that portion of the map that contains information required under § 75.371 is subject to approval by the district manager.

The final rule continues to require the mine operator to submit a proposed ventilation plan in writing to the district manager for approval. The plan must be designed to control methane and respirable dust and must be suitable to conditions at the mine. However, under the final rule, once a ventilation plan is approved, the operator needs to submit only the revised pages, maps or sketches of the plan when proposing revisions. For example, the entire plan does not need to be submitted when the operator proposes a small addition or the replacement of a few pages. However, when required in writing by the district manager, the operator must submit a fully revised plan by consolidating the plan and all revisions in an orderly manner and by deleting all outdated material. It has been the Agency's experience under the existing rule that over a period of time, ventilation plans can become so large that it is confusing or nearly impossible to understand all aspects of the plan or what system of ventilation is being used. In most instances, this is caused by outdated additions and revisions of revisions, or by provisions that are no longer in use at the mine. In these cases, the district manager needs an updated plan.

Paragraph (a)(3) requires that a copy of any proposed ventilation plan and any plan revisions which are submitted for approval must be made available for inspection by the representatives of miners and be posted on the mine bulletin board.

MSHA agrees with commenters that miners have a stake in the implementation of the ventilation plan at each mine. Recognizing this role and the importance of mine plans to an effective safety and health program, commenters noted that many operators provide miners with a copy of the proposed plan before it is submitted to MSHA for approval. The commenters also noted that some existing wage and hour agreements in the industry address this issue, and under these contracts miners have the right to review plan provisions before they are submitted to MSHA. Also, MSHA district managers meet with miners' representatives to discuss plan provisions upon request and have accepted written material the miners would like MSHA to consider while the plan is being reviewed. Related to this issue, miners have the right under section 103(g) of the Act to request an inspection by MSHA of any alleged hazardous condition in the mine. Under the final rule, these practices and procedures will continue to involve miners' representatives in the development of meaningful and effective plans.

The proposed rule would have formally allowed the representative of miners to submit additional information concerning the plan and meet with the district manager to discuss this plan. Several commenters objected to these proposed provisions. The commenters stated that it would be inappropriate for miners' representatives to be involved in the ventilation plan review process because the operator is legally responsible for the contents of the approved ventilation plan. These commenters stated that the operator should not be responsible for plan provisions proposed by miners' representatives. Commenters also suggested that the proposal conflicts with provisions of other Federal statutes governing collective bargaining and labor-management relations. MSHA finds these arguments compelling, and the final rule does not include a formal role for miners' representatives in the plan approval process.

Paragraph (b) sets out the procedure for notification of approval or denial of approval of ventilation plans, retaining the existing practice that the operator be given written notice of approval actions. Under the final rule, MSHA will advise the operator of the deficiencies of the proposed plan or revision for which approval is denied. The operator is then given an opportunity to discuss with the district manager the problems identified and potential solutions.

The proposal provided that when disagreements regarding plan provisions cannot be resolved between the operator and district manager, the operator would be permitted to appeal plan approval decisions by district managers to MSHA's Administrator for Coal Mine Safety and Health. After reviewing the appeal, the Administrator would have issued a final decision on the disputed plan provisions. Several commenters recommended that a new set of regulations be developed in a separate rulemaking to establish comprehensive procedures for approving all mine plans. The Agency has not adopted this recommendation. Under the existing rule, MSHA has allowed appeal to the Administrator through policy to ensure a uniform approach to plan approval. This will continue under the final rule. The proper avenue for formal appeal is for the operator to present his or her case to the Federal Mine Safety and Health Review Commission and under the existing rule MSHA has adopted a policy to assist the operator in obtaining a speedy review by the Commission. MSHA anticipates that most plan approval issues will be resolved at the district manager level but in those instances where an issue cannot be resolved and MSHA cannot approve a proposed change to a ventilation plan, the Agency plans to continue this policy.

Consistent with existing practices, paragraph (c) clarifies that ventilation plans or revisions may not be implemented until approved. In addition, paragraph (c) sets forth provisions by which the operator may be guided in submitting revisions to a ventilation plan when a change alters the main air current in a manner that materially affects the safety and health of miners, or any change to the information required in § 75.371. These revisions and changes must be approved by the district manager before implementation at the mine. This provision of paragraph (c) is based on the requirement of § 75.324 concerning intentional changes in the ventilation system.

Paragraph (d) requires that before implementation of a revision to an approved ventilation plan, all persons in the mine who are affected by the revision must be instructed in its provisions. Complete understanding of

the requirements of the approved plan is essential for it to be effective.

Paragraph (e) requires that approved plans and any revisions be available at the mine for inspection by an authorized representative of the Secretary and representatives of the miners and be posted on the mine bulletin board. The proposal would have simply required that the approved plan be available to the miners and the representatives of the miners. The final rule clarifies the method that will be used to make the approved plan available to the miners.

Paragraph (f) specifies that approved ventilation plans must be reviewed by MSHA at least every 6 months. Unlike the existing rule, the final rule does not specify that the operator must review plans every 6 months. However, since paragraph (a)(1) requires the operator's plan to be suitable to conditions in the mine, the operator must update the ventilation plan as often as is necessary to ensure that the plan is suitable to current conditions in the mine. Therefore, the final rule does not reduce the level of protection provided miners by the existing rule.

Paragraph (g) requires existing ventilation plans to be revised to meet the requirements of the new subpart D within 6 months from the effective date of the final rule. This provision affects only ventilation plans that contain provisions conflicting with the final rule. As previously discussed, many of the provisions that are currently required to be addressed on a mine-by-mine basis through ventilation plans have been included in the final rule as provisions applicable to all mines. Such provisions no longer need to be addressed in the plan. Revising conflicting provisions in plans ensures that miners are aware of the approved plan's requirements and eliminates any ambiguities that may arise.

Section 75.371 Mine Ventilation Plan; Contents

This section is derived from existing §§ 75.316–1 and 75.316–2. It sets out the information the operator must include in the mine's ventilation plan. As structured, the requirements of the plan are grouped into like areas to facilitate use by both the operator and MSHA.

Under the existing rules, the criteria listed in § 75.316–2 establishes the basic content of ventilation plans. The district manager may approve plan provisions that do not conform to these criteria if the district manager agrees with the operator that the results of the alternative provisions will not lessen the protection provided to miners. The existing criteria also includes requirements for construction of stoppings and bleeder systems.

The final rule does not include criteria to be addressed on a mine-by-mine basis through the ventilation plan. Rather, the final rule provides the level of safety provided by existing criteria by separate rulemaking standards that apply to all mines. Some examples are the requirements for construction of stoppings in § 75.333 (ventilation controls), for bleeder systems in § 75.334 (worked-out areas and areas where pillars are being recovered), and for weekly examination of bleeder systems in § 75.364 (weekly examination).

The final rule requires the approved ventilation plan for each mine to contain only the particular air flow and methane and dust control measures necessary to address the unique conditions of the mine. For example, under paragraph (cc), mines with a demonstrated history of spontaneous combustion must specify for MSHA's approval the measures that will be used to detect methane, carbon monoxide, and oxygen concentration during and after pillar recovery and in worked-out areas where no pillars have been recovered and the actions that will be taken to protect miners from the hazards of spontaneous combustion. If a bleeder system will not be used in a spontaneous combustion mine, the ventilation plan must include a description of the methods used to control spontaneous combustion, accumulations of methane-air mixtures, and other gases, dust, and fumes in the worked-out area.

In the above example, paragraph (cc) provides an alternative for the small number of mines where the use of a bleeder system can increase the danger to miners. However, the alternative provided by paragraph (cc) does not reduce the level of protection provided miners by the existing rule or by the general requirements for bleeder systems in § 75.334. A number of commenters suggested that the proposal was not responsive to the needs and concerns of those mines with a spontaneous combustion problem. MSHA has reconsidered and the final rule through the approved ventilation plan permits the district manager and the mine operator to address this special problem on a mine-by-mine basis.

Because the ventilation plan provisions may include equally effective alternatives to some of the general requirements in the final rule, as well as other relevant information about the mine and the ventilation system, mine ventilation plans will be more relevant, practical, and useful. Making existing plan approval criteria into separate mandatory standards, if the criteria generally applies to all mines, also makes ventilation plans less complex.

Despite concerns expressed by some commenters, the final rule retains the existing provision that authorizes the district manager to require the ventilation plan to include provisions beyond those listed. This provision is a necessary safety measure that allows MSHA to address unique hazards at individual mines that the final rule cannot anticipate.

Paragraph (a) requires each ventilation plan to specify the mine name, the name of the company owning or controlling the mine, the mine identification number, and the name of the individual submitting the plan. This requirement enables MSHA to develop a complete information base so that decisions affecting ventilation at the mine can be made on the basis of all relevant facts, including the mine's previous enforcement history. The name of the individual submitting the plan is required to enable MSHA to contact directly the individual responsible for the information contained in the plan.

Paragraph (b) addresses planned main mine fan stoppages. Section 75.311 requires main mine fans to be continuously operated except when stopped for scheduled testing, maintenance, or adjustments. As under existing § 75.300–3, § 75.311 permits other fan stoppages if the reasons for the stoppages, together with the procedures to be followed during the stoppage and restart, are specified in the plan. This rule recognizes that some mines that do not have large nonpillared worked-out areas or have not done any second mining do not need to operate the main mine fan or fans when the mine is idle. Also, because these are generally smaller mines that often operate for only one shift per day, the final rule, in § 75.310, allows devices other than pressure recording devices to be used to monitor main mine fan pressure at these mines. The alternative device must be specified in the ventilation plan.

Under paragraph (c), the ventilation plan must specify the methods used to protect main mine fans and associated components from an underground explosion, if the 15-foot offset from the nearest side of the mine opening required by § 75.310 (installation of main mine fans) cannot be provided. This continues the practice of requiring approval of fan installations with an offset of less than 15 feet under existing criteria. Section 75.311 (main mine fan operation) prohibits combustible and flammable material accumulations in the area surrounding main mine fans

and intake air openings for at least 100 feet. Under paragraph (c), the approved ventilation plan may specify other safe methods of protecting main mine fans and intake air openings from combustible and flammable material if a clear area of 100 feet cannot be provided.

Paragraph (d) allows procedures to be established in the plan for situations involving main fan stoppages. Under § 75.311, persons must be withdrawn from the mine and electric power circuits entering underground areas of the mine must be deenergized if ventilation is interrupted. In certain situations when a fan is stopped, back-up fan systems may be used to restore ventilation, although such fans may not provide all of the ventilating quantity provided by the stopped fan. Under these circumstances, a sufficient quantity of air may be provided to allow certain necessary underground activities to be conducted, such as pumping water. Therefore, if such systems are used, the ventilation plan must include information regarding the persons permitted in the mine, the work that these individuals will be doing, and the electric power circuits that will remain energized. As discussed under § 75.313, this plan provision may specify persons who will be permitted to reenter the mine and power circuits that may be energized following an unplanned fan stoppage provided the requirement of § 75.313 relative to withdrawal of persons and deenergization of electrical circuits and equipment are complied with.

Paragraph (e) requires that when booster fans are used in anthracite mines the locations and operating conditions of these fans must be specified and approved in the ventilation plan. As discussed previously, booster fans are currently used in anthracite mines to provide necessary ventilation to working areas. Due to the unique mining conditions found, and practices used in anthracite mines, ventilation of many anthracite mines would not be possible without the use of underground fans.

Because control of methane accumulation and respirable dust are the primary purposes of a mine's ventilation system, each plan must include information regarding means to be used to minimize these hazards. For control of both methane and dust, paragraph (f) requires ventilation plans to specify the face ventilation systems used, and to provide drawings illustrating how such systems are used on each working section. In addition, the plan must include a description of each different dust suppression system used on equipment on working sections. The Agency intends that this description will be of sufficient detail to illustrate how it is used on the equipment. This would include the type of sprays used, the locations of these sprays, the angles at which these sprays are directed, the number of sprays to be used, the water pressure at which sprays will be operated, and the gallons per minute of water that each spray will deliver at the operating pressure specified.

If air quantities need to be greater than 3,000 cfm in bituminous and lignite mines or 1,500 cfm in anthracite mines, these quantities must be specified in the ventilation plan under paragraphs (g) and (h), respectively. Particular mining conditions such as methane levels may require greater quantities than the minimums set in § 75.325. Under paragraph (i), the approved ventilation plan must include the locations and specific air quantities for working places and working faces other than where coal is being cut, mined, drilled for blasting, or loaded when a minimum air quantity is required.

Under paragraph (j), if machine mounted dust collectors or diffuser fans are used, the ventilation plan must specify the operating volume of these devices. This information is needed to establish appropriate air quantities when dust collectors or diffuser fans are used because quantities which are either too much greater or much less than these operating volumes may adversely impact methane and dust control in the immediate face area.

Paragraph (k) addresses alternative mean entry air velocities in exhausting face ventilation systems. Section 75.326 (mean entry air velocity) requires at least a 60 fpm mean air velocity in such systems. A lower mean entry air velocity may be specified in the ventilation plan if compliance with the applicable respirable dust standards can be maintained. Under the appropriate circumstances compliance with the dust standards can be maintained with lower air velocities. This practice has been successful under the existing standards. As in the existing rule the district manager may designate other working places where the 60 fpm or some other mean entry air velocity must be maintained.

As required by § 75.330 (face ventilation controls), paragraph (l) specifies that the approved ventilation plan must include the maximum distance if other than 10 feet from each working face where control devices will be located. Additionally, other working places where face ventilation controls are used and the maximum distance these controls will be maintained from the face must be specified under paragraph (l).

Paragraph (m) requires the approved ventilation plan to specify the quantity of air reaching the last open crosscut in any pair or set of developing entries or rooms in bituminous and lignite coal mines if this quantity is required to be greater than 9,000 cfm. This permits varying mining conditions and types of face ventilation systems to be considered when establishing the air quantities necessary for effective methane and dust control at each mine. The last open crosscut quantity requirement is necessary to ensure that adequate air is available on the section for face ventilation. Similarly, in anthracite mines if the minimum air quantity in the last open crosscut is required to be greater than 5,000 cfm, paragraph (n) requires that the air quantity be specified in the approved ventilation plan.

Under § 75.333 (ventilation controls), separation of intake and return air courses by permanent stoppings must be maintained to and including the third connecting crosscut outby each working face. In some circumstances, however, the integrity of intake and return air courses can be ensured if separation is maintained to and including the fourth connecting crosscut. In addition, the possibility of accidents occurring when equipment is driven through brattice curtain can be reduced. In other cases, it may be necessary to maintain separation by permanent controls to distances closer to the working face than the third crosscut to minimize leakage through temporary controls and thus increase air flow to the face. To address these situations, § 75.333 provides for approval of alternatives concerning the separation of intake and return air courses to crosscut locations other than the third connecting crosscut. Paragraph (o) requires that when separations of intake and return air courses will be built to other than the third crosscut outby the face, the location must be specified in the approved ventilation plan.

Paragraph (p) addresses the requirement in § 75.325(c) and requires longwalls and shortwalls to be ventilated with at least 30,000 cfm unless the operator demonstrates that a lesser quantity will maintain continual compliance with applicable methane and respirable dust standards or a greater quantity is required. Paragraph (p) requires that when the quantity is different than 30,000 cfm, the quantity will be specified in the ventilation plan.

Also for longwall and shortwall ventilation, paragraph (q) specifies that the velocities required to control methane and respirable dust below applicable standards and the locations where these velocities will be provided be included in the plan. Section 75.325(d) requires that areas where mechanized mining equipment, including longwall equipment, is being installed and removed be ventilated. Paragraph (r) requires that the quantity which will be provided be included in the ventilation plan.

The on-shift examination provisions in § 75.362(d) require that a methane test be made by a qualified person immediately before equipment is energized, taken into, or operated in a working place and at 20-minute intervals during the operation of this equipment. These tests are to be made at the last row of permanent support, unless they are required to be made closer to the face using an extendable probe or other acceptable means. Consistent with this provision, paragraph (s) requires that the locations where these tests will be made closer to the face than the last row of permanent support be specified in the ventilation plan.

In conjunction with existing § 70.208 (bi-monthly sampling; designated areas), paragraph (t) requires the plan to specify the locations where the operator must collect designated area samples, as well as the specific location of each sampling device, and the plan must include a description of the respirable dust control measures used at the dust generating sources for these locations.

Paragraph (u) requires the plan to specify the methane and dust control systems at underground coal dumps, crushers, transfer points, and haulageways. At these locations, freshly mined coal can liberate significant quantities of methane, and dust levels can be elevated.

Like the existing rule, § 75.327 limits the velocity of the air current in the belt haulage entry to 250 fpm unless the district manager approves a higher velocity. Paragraph (v) specifies that areas in the trolley haulage entries where the velocity will be greater than 250 fpm and the velocities at these locations be in the ventilation plan.

Paragraph (g) of § 75.333 requires that a crosscut be made or line brattice installed and maintained before mining is discontinued in an entry or room that is advanced more than 20 feet from the inby rib. Recognizing that conditions such as methane liberation may require a cross cut or line brattice in some entries or rooms advanced less than 20 feet, § 75.333(g) requires a shorter distance to be specified in the approved ventilation plan. This distance is required under paragraph (w).

Paragraph (x) requires a description of the bleeder systems to be used and the design of the system. The means of determining the effectiveness of the bleeder system is required to be included in the ventilation plan under paragraph (y). Paragraph (z) requires that the approved ventilation plan include the locations of evaluation points where measurements of methane and oxygen concentrations and tests to determine whether the air is moving in the proper direction will be made when these tests will not be made at the point of deepest penetration in nonpillared worked-out areas or when bleeder systems are not travelled in their entirety.

Related to worked-out areas and consistent with existing criteria, paragraphs (aa) and (bb) require the approved ventilation plan to specify the means for adequately maintaining bleeder entries free of obstructions such as roof falls and standing water and the location of ventilating devices such as regulators, stoppings and bleeder connectors used to control air movement through worked-out areas.

As discussed previously, under paragraph (cc), mines with a demonstrated history of spontaneous combustion must specify for MSHA's approval the measures that will be used to detect methane, carbon monoxide, and oxygen concentration during and after pillar recovery and in worked-out areas where no pillars have been recovered, including the actions that will be taken to protect miners from the hazards of spontaneous combustion. If a bleeder system will not be used in a spontaneous combustion mine, the ventilation plan also must include a description of the methods used to control spontaneous combustion, accumulations of methane-air mixtures, and other gases, dust, and fumes in the worked-out area.

Because of the increased use of degasification systems and the problems which can result such as mining into or through a vertical degasification hole, paragraph (dd), requires the ventilation plan to include information regarding the location of all vertical degasification holes and horizontal degasification holes in excess of 1,000 feet in length. Similarly, if methane drainage systems are used to control methane, paragraph (ee) requires a detailed sketch of each system to be included in the plan, as well as a description of the safety precautions that are used with these systems.

Section 75.335 (construction of seals) specifies methods and materials that must be used to create seals. Under paragraph (ff), the ventilation plan must include a description of the methods and materials that are used to create seals if those methods or materials will be different than those specified in § 75.335. The alternative methods or materials must be capable of withstanding a 20 psig explosion when installed.

Paragraph (gg) requires that when an alternative to installing a methane sensor on the longwall shearing machine is proposed, the alternative location or locations must be specified in the ventilation plan. As discussed previously under § 75.342 this provision is intended to provide flexibility in determining the best places on a particular longwall unit to locate the additional sensing device to provide maximum protection to miners.

Monitoring for carbon monoxide levels is specified in § 75.340 of this final rule. These systems, if used, must perform specific functions at specified levels above the ambient level as required by §§ 75.340 and 75.351. If monitoring systems are used, paragraph (hh) specifies that the ambient level of carbon monoxide in the areas where they are used and the method used to determine the ambient level be included in the ventilation plan.

Consistent with § 75.1707 of the existing rule, paragraph (ii) requires that the distance that separation between the primary escapeway and the belt or track haulage entries will be maintained if other than to the first connecting crosscut outby the section loading point be specified in the ventilation plan.

Section 75.381 addresses requirements for escapeways in anthracite mines and requires escapeways to be maintained 4 feet by 5 feet unless these dimensions cannot be maintained due to the extreme pitch of the coal seam. Under these circumstances, the dimensions to which these escapeways will be maintained and the locations where these dimensions will be maintained is required to be specified under paragraph (jj).

Under the proposal, before planned mining into an inaccessible area, the procedures for mining through were to be specified in the ventilation plan. This requirement is not retained in the final rule. Because of the infrequency of this occurrence and the fact that 2 cut-through or mining-through operations are seldom similar, the final rule, § 75.389, requires the procedures and precautions to be included in a separate plan which must be approved by the district manager. Typically, this has been handled in the ventilation plan. The ventilation plan normally would

have included the method of ventilation, the ventilation controls to be used, the air quantities and velocities to be maintained, and other procedures and precautions that would be used during the mining-through operations. The Agency intends that the plan required by the final rule will contain similar information.

A commenter suggested that the ventilation plan limit the number of pieces of diesel equipment that could operate on any split of air. This suggestion has not been included in the final rule because the operation of diesel equipment is the subject of a separate rulemaking. Until completion of that rulemaking, air contaminants from diesel equipment are addressed by § 75.321, air quality.

Section 75.372 Mine Ventilation Map

This section is derived in part from existing §§ 75.316–1, 75.1200 and 75.1200–1 It requires the operator to submit an accurate up-to-date mine ventilation map to the district manager at least once every 12 months.

The ventilation map provides basic information for evaluation of the mine s ventilation plan. So that enough maps are available for MSHA to effectively evaluate the plans, the operator must submit 3 copies.

Paragraph (a)(1) retains the existing provision that maps be scaled to not more than 500 feet to the inch and adds a provision that the scale be not less than 100 feet to the inch. Also, MSHA retains the requirement that a registered engineer or a registered surveyor must certify that the map is accurate.

Paragraph (a)(2) permits information required under § 75.371 to be shown on the map. As discussed previously, MSHA recognizes that some of the information required to be submitted under § 75.371 is best shown on a map. Rather than require additional maps, this information may be shown on the § 75.372 map. When shown on the § 75.372 map, only that portion of the map that contains information required under § 75.371 is subject to approval by the district manager.

Paragraph (b) lists the information that is required to be submitted to MSHA. MSHA will use the items specified in paragraph (b) in evaluating the mine s ventilation plan therefore this information must be accurate and up to date.

Under paragraph (b)(1), ventilation maps must show the mine name, company name, and the mine identification number. This requirement enables MSHA to develop a complete information base so that decisions affecting ventilation at the mine can be made on the basis of all relevant facts. To facilitate MSHA's understanding of the information submitted, all maps must have a legend identifying the scale of the map and the symbols used. The name of the individual submitting the map also is required to enable MSHA to contact directly the individual responsible for the information shown on the map.

Like the map requirements in existing § 75.316–1, paragraph (b)(2) requires the ventilation map to show all areas of the mine, including sealed and unsealed worked-out areas, and information regarding adjacent mine workings. All known mine workings on mine property that are located in the same coalbed, and all other known mine workings that are located in the same coalbed that are within 1,000 feet of existing or projected workings, must be on the map. Mining through unintentionally into an adjacent working could disrupt mine ventilation and expose miners to hazards from water accumulations, oxygen deficiency, accumulations of methane, or other gases. The final rule permits a scale not exceeding 2,000 feet to the inch for adjacent workings so that these areas can be more easily shown on the map. The proposal would have required all other known mine workings that are located in the same coalbed that are within 200 feet of existing or projected workings, to be on the map. The final rule has expanded this distance to 1,000 feet in recognition of the speed with which mining can advance and the fact that maps are now to be submitted every 12 months instead of every 6 months as was the case under the existing rule.

Paragraph (b)(4) retains the existing requirement that all known mine workings that are above or below the mine property be shown on the map. The distance between mine workings also must be shown. Overlying workings can present serious hazards Water can accumulate in such areas and inundate underlying active workings if a roof fall or similar event occurs. When old workings lie below an active mine, cracks or other openings into these workings can provide a path for methane or other gases to enter the active mine. In response to comments, the Agency will accept map overlays where appropriate.

Accidental mining into an oil or gas well underground can result in an ignition, fire, or explosion. Accordingly. paragraph (b)(5) requires the locations of all known oil and gas wells, and the location of all known oil or gas drill holes that penetrate the coalbed being mined, to be shown on the map. This was a requirement of the existing rule

Under paragraph (b)(6), the map must include the location and specifications of each main mine fan and backup fans. To provide information regarding air entering and leaving the mine, paragraph (b)(7) requires that each map show mine openings and the direction and quantity of air measured at each opening. Paragraph (b)(8) requires the elevation at the top and bottom of each shaft and slope and its dimensions to be on the map.

Under paragraph (b)(9) the direction of air flow in all underground areas of the mine must appear on the map. Under paragraph (b)(10) the maps must include the locations of all active working sections and the four-digit identification number for each mechanized mining unit. The location of all escapeways must also be shown under paragraph (b)(11). Paragraph (b)(12) requires the location of all ventilation controls, excluding temporary ventilation controls used on working sections, in order to provide a visual layout of the ventilation system of the mine. Paragraph (b)(13) requires the direction and quantity of air in each working section to be shown so that the air is depicted entering and leaving each split, passing through the last open crosscut of each set of entries or rooms, and at the intake end of each pillar line. Unlike the existing rule, the final rule does not require the map to show the volume of air at each working face. This does not reduce the level of protection provided miners by the existing standard because § 75.325 requires at least 3,000 cfm at each working face and at other working places specified in the ventilation plan. If more air is necessary at the face, § 75.325(a)(1) requires the increased quantity to be addressed in the approved ventilation plan. Thus, no additional safety benefit results from also requiring this information to be shown on the map.

Paragraph (b)(14) retains the existing requirement that at least 12 months of anticipated mine development be included on the map. These projections must show proposed ventilation controls, proposed bleeder systems, and the anticipated locations of intake and return air courses, belt entries, and escapeways. The location of existing methane drainage systems must also be depicted on the map under paragraph (b)(15).

Paragraph (b)(16) is a new provision which requires the map to show the location of all AMS sensors. This information verifies that sensors are located in areas where adequate monitoring can be maintained.

Paragraph (b)(17) requires the map to include contour lines that pass through the whole number elevations of the coalbed being mined. These lines must be spaced at 10-foot elevation levels, unless a wider spacing is permitted by the district manager. This provision is based on existing § 75.1200–1(m). The final rule does not retain the existing requirement that the ventilation map show any abnormal conditions, such as faults, that may affect the mine s ventilation system design. The requirement for contour lines showing the whole number elevations of the coalbed being mined will indicate any geologic abnormalities in the mine.

Under paragraph (b)(18) the location of proposed seals for worked-out areas must also be included on the map so that a determination can be made that an area of a mine can be sealed. Under § 75.334, each mining system must be designed so that each worked-out area can be sealed.

Under paragraph (c), the mine map that is required by existing § 75.1200 (mine map) may be submitted as the ventilation map if all the information required by the final rule is included on the map.

Section 75.373 Reopening Mines

This section is derived from existing § 75.325. Like the existing rule, it specifies that after a mine is abandoned or declared inactive, and before it is reopened, mining operations cannot begin until MSHA has been notified and the mine has been inspected.

In the proposal, MSHA proposed deletion of existing § 75.325, largely because existing § 75.1721 also addresses reopening mines and requires the operator to submit preliminary mine plans and inform the district manager of the approximate date for reopening. A commenter objected, stressing the need for MSHA to inspect mines before they are reopened.

Because of the commenter's objection, MSHA has reassessed the application of existing § 75.325. Under that rule, MSHA receives notification of the commencement of mining operations much closer to the actual start of these operations than under § 75 1721. When notified, MSHA will inspect the mine before mining operations begin but will not take enforcement action if any observed deficiencies are corrected promptly. This practice enables MSHA inspectors to assess accurately the proposed mining systems and to identify any potential problems that may present hazards to miners when mining operations commence. Therefore, the final rule retains existing § 75.325 without substantive change.

Section 75.380 Escapeways; Bituminous and Lignite Mines

This section is derived from existing §§ 75 1704, 75.1704–1, 75 1704–2, and 75.1707. The final rule establishes requirements for escapeways for bituminous and lignite mines. Escapeway requirements for anthracite mines are addressed separately in § 75.381 of the final rule.

Escapeways are the primary means of escape for miners during a mine fire or similar life-threatening emergency. Accordingly, the final rule retains the existing requirement that at least two travelable passageways in each mine be designated as escapeways and be provided from each working section. The final rule sets minimum requirements for all escapeways, including separate requirements for the primary escapeway and the alternate or secondary escapeways. The terms "primary" and "alternate" distinguish the two required escapeways from each other and are used to clarify which requirements in the rule apply to each.

Paragraph (a) retains the existing requirement that the escapeways must be maintained travelable and separate and distinct from each other. This increases the likelihood that if one escapeway loses its effectiveness as an escape route or becomes untravelable during a mine emergency, the other escapeway would still provide a way out of the mine.

Paragraph (b) requires escapeways from each working section and from each area where mining equipment is being installed or removed. These escapeways must be continuous to the surface escape drift opening or to the escape shaft or slope facilities to the surface. Paragraph (b)(2) recognizes that during the installation or removal of mechanized mining equipment, the term working section, as defined, may not be appropriate because in one case the loading point may not yet be located by the installation of a belt tailpiece or feeder and in the other, it may have already been removed. In these cases, the required escapeways must begin at the projected location of the loading point in areas where equipment is being installed and at the location of the last loading point for the section when equipment is being removed. This aspect of the final rule clarifies the existing provision and is necessary to provide safe escape for miners from hazards that may develop during this phase of the mining operation.

Consistent with existing regulations and policy, paragraph (c) prohibits escapeways from ending at a common shaft, slope, or drift opening. Thus, while mines may ventilate both escapeways from the same surface opening under paragraph (b), one of the two escapeways must continue from this location to a second shaft, slope, or drift to allow escape to the surface. Consistent with existing practice, however, paragraph (c) clarifies that the same shaft or slope may be used to provide the escapeways if the shaft or slope is separated by walls constructed of noncombustible material. When partitioned in this manner, the two escapeways are separate and distinct to the surface and thus comply with paragraph (b).

Under paragraph (d)(1), escapeways must be maintained in safe condition to always ensure passage by any person, including disabled persons. Paragraph (d)(2) requires all escapeways to be clearly marked to show the route and direction of travel to the surface. Together with the requirement in § 75.333 that doors be provided at specified intervals and that the location of all doors along escapeways be clearly marked so that doors may be easily identified by anyone traveling in the escapeway and in entries on either side of the escapeway, this requirement will greatly enhance the ease with which miners can escape. A commenter suggested that this provision also should specify that a lifeline be required through the escapeway and recommended that the lifeline be equipped with directional cones to indicate the direction of travel. Although lifelines may be feasible in some mines, and MSHA encourages their use, the Agency finds that in most mining systems lifelines would be subject to frequent damage from roof falls, haulage equipment, and other disturbances. Thus the overall safety benefits of these devices would be minimal and the final rule does not include the commenter's suggestion.

Also, to facilitate travel, paragraph (d)(3) requires escapeways to be maintained to at least a height of 5 feet from the mine floor to the mine roof, excluding the thickness of any roof support. Like the existing rule, this provision requires that the 5-foot clearance be maintained to the roof, not to the low point of any roof support. As under the existing § 75.1704–1(a), to minimize the impact of this requirement in lower coal seams, escapeways must be maintained to the height of the seam where the seam height is less than 5 feet. Paragraph (d)(4) requires escapeways to be maintained at least 6 feet wide. This requirement retains the existing provision in § 75 1704–1 that escapeways be maintained at a width of

at least 6 feet, so that a person on a stretcher can be easily carried out of a mine during an emergency. Additionally, as noted by commenters, maintaining a minimum width of 6 feet will enhance escape. MSHA had proposed a minimum width of 4 feet and continues to recognize circumstances where widths less than 6 feet may be necessary, such as where the route of travel passes through doors or other permanent ventilation controls or where necessary supplemental roof support is installed, such as cribs or timbers. At these locations, paragraphs (d)(4)(i) and (d)(4)(ii) require the escapeway to be wide enough to enable miners to escape quickly in an emergency. This provision is consistent with the existing rule which allows escapeways less than 6 feet wide to be used if the district manager is satisfied that the escapeway enables miners to escape quickly in an emergency. MSHA will determine, during inspection activities, whether the escapeways provide quick passage through areas where the route of travel is narrowed.

Paragraph (d)(5) requires escapeways to follow the most safe and direct practical route to the surface. Where escapeways cross over obstructions, such as overcasts or belts, paragraph (d)(6) requires them to be provided with ladders, stairways, ramps or similar facilities to allow miners to cross and transport disabled persons.

Paragraph (e) retains the existing provision requiring surface openings to be adequately protected to prevent surface fires, fumes, smoke and floodwater from entering the mine. This requirement helps to ensure that escapeways do not become threatened by hazards occurring on the surface and is particularly important if escapeways are ventilated by intake air, as the primary escapeway must be under § 75.380. A fire on the surface near an intake air opening that is part of an escapeway could produce carbon monoxide that could be drawn into the mine unless steps are taken to prevent this hazard.

Under paragraph (f), one of the two escapeways must be designated as the primary escapeway. This escapeway, as under existing § 75.1704, must be ventilated with intake air. Paragraph (f) prohibits the primary escapeway from containing compressors, certain electrical equipment, and diesel equipment. As proposed, however, the final rule does not require removal of this equipment in areas of mines developed before August 16, 1992. However, it does prohibit installation of this equipment in areas developed after August 15, 1992. As proposed, the final rule permits equipment in the escapeway necessary to maintain the escapeway in safe, travelable condition, including pumps specified under §§ 75.340(b)(2) through 75.340(b)(6). Also, haulage equipment necessary for the transportation of persons and materials is permitted. Additionally, if a roof fall occurs in a primary escapeway, equipment necessary to clean up or remove the fall and to support the roof would be permitted in the escapeway for the time necessary to complete that work.

Paragraph (f)(1)(ii) requires that any mobile equipment used or operated in the primary escapeway must be equipped with a multipurpose dry power type fire suppression system suitable for the intended purpose and listed or approved by a nationally recognized independent testing laboratory. This provision is in response to a commenter who suggested that no electrical equipment of any type be permitted in this escapeway. MSHA recognizes the need to protect the primary escapeway but the Agency also realizes that different mine designs and the need to maintain air courses safe for travel will necessitate the operation of some mobile equipment in the primary escapeway. For this reason, MSHA has elected to require fire suppression systems. Unlike the proposal, the final rule does not allow underground substations, power centers, and permanent pumping stations in the primary escapeway even if housed in fire proof structures and provided with an automatic fire suppression system. MSHA agrees with commenters that each mine should have a substantially "smoke-free" intake escapeway. Providing miners with a primary intake escapeway relatively free of fire sources will appreciably increase safety.

Derived from existing § 75.1707, paragraph (g) specifies that the primary escapeway must be separated from belt and trolley haulage entries for its entire length, from the first connecting crosscut outby the loading point to the surface. Separation of the primary escapeway from belt and trolley haulage entries minimizes the potential for fire and explosion hazards in this escapeway. The final rule, however, requires separation in older mining systems only where it existed before August 16, 1992. Therefore, separation is not required for areas where separation is not required under the existing rule. Existing § 75.1707 does not require separation in working sections of mines opened before March 30, 1970. In all other cases it authorizes the district manager to approve this separation for greater or lesser distances than are otherwise required and like the existing rule, the final rule retains this provision.

Paragraph (h) separately addresses the alternate escapeway and requires that it be separated from the primary escapeway for its entire length. Unlike the proposal, the final rule does not require the alternate escapeway to be ventilated with intake air. MSHA has referred this issue, along with several other issues, to an advisory committee approved by the Secretary of Labor. The final rule permits the primary and alternate escapeways to be ventilated from a common intake air shaft or slope opening. The practice of providing a pressure separation between air courses at the bottom of shafts and slopes is a widely accepted practice under the existing rule. This provision has been included in the final rule as a matter of clarification. It is not the Agency s intent however, to permit pressure separation anywhere but at the bottom of the shaft or slope involved.

Paragraph (i) addresses shafts and slopes in designated escapeways and requires that mechanical escape facilities be provided and maintained for each slope to the surface under specified circumstances. This provision addresses only those slopes that form a passage from the coal seam to the surface. It applies to shafts that are greater than 50 feet in depth and to slopes either inclined 18 degrees or more from the horizontal or inclined 9 degrees from the horizontal for a distance of at least 1,000 feet. The slope requirements clarify the proposal and are based on the suggestion of a commenter that shallow angle slopes do not provide a significant impairment to escape. The final rule adopts the commenter's recommendation but limits the distance of such slopes. Although escape may not be impeded by a shallow-angle slope over short distances, escape could become more difficult as the length of the shallow slope increases. The final rule modifies the existing provision in § 75 1704, which states that escape facilities must be provided for all slopes that are part of escapeways; however, the final rule does not reduce the level of protection provided miners by the existing rule. In short or shallow-angle slopes, escape may be impeded by escape facilities, especially where several miners are exiting the mine and the escape facilities are designed for a small number at a time. In these circumstances, no hazard would be presented if miners were to walk out of the mine, and escape would in most cases be accomplished more quickly

A commenter suggested that the final rule should require, based on existing criteria for district manager approval of escapeways, mechanical escape facilities in all shafts greater than 20 feet in depth, rather than for shafts greater than 50 feet in depth. Other commenters suggested that mechanical escape facilities should only be required for shafts greater than 100 feet in depth. The final rule does not adopt either of these recommendations. As discussed below, stairways are permitted instead of mechanical facilities in shafts less than 50 feet deep that are part of escapeways. As with short or shallow-angle slopes, in shallow-type shafts (less than 50 feet), escape usually can be made more quickly using stairways than mechanical escape facilities. Thus, the final rule does not reduce the level of protection provided by the existing criterion in § 75.1704–1(b).

Specific technical and performance requirements for mechanical escape facilities are included in § 75.382. Also, paragraph (j) requires mechanical escape facilities provided under paragraph (i) to be operational at the bottom of each shaft and slope that is part of an escapeway within 30 minutes of notification of surface mine personnel that an emergency requiring evacuation has occurred. A commenter questioned whether a single mobile hoist would be permitted to service more than one shaft which is part of an escapeway. Because during an emergency requiring the use of an emergency hoist or hoists, miners may be attempting to escape from more than one shaft or slope it is important that mechanical escape facilities be provided for each shaft or slope. Thus, the same escape facility may not service more than one shaft or slope at a mine. The Agency recognizes that some operators operate more than one mine in an area or that in some areas operators have pooled resources. Because the likelihood of events requiring simultaneous escape from more than one mine is remote, the Agency would accept an arrangement where more than one mine is serviced by the same mechanical escape facility provided (1) enough facilities are provided to satisfy the maximum need of the mine in the group that has the maximum demand and (2) facilities can be operational at the bottom of each shaft and slope that is part of an escapeway within 30 minutes of notification of surface mine personnel that an emergency requiring evacuation has occurred. Another commenter questioned whether 30 minutes was too long a time to provide mechanical escape facilities. MSHA's experience has been that 30 minutes is a reasonable amount of time given that it begins when miners on the surface first become aware of a problem and miners underground must be notified and must travel to the escape facility from their working stations.

Paragraph (k) requires a means of signalling a surface location to be provided at the bottom of each slope or shaft that is part of an escapeway. A person must always be on duty at this surface location when persons are underground. If a signal is activated or the evacuation of personnel is otherwise necessary, this person must take appropriate action to ensure that mechanical facilities are operational within 30 minutes at the bottom of shafts or slopes. In response to comments, paragraph (k) clarifies that no signal is required where automatically activated hoisting equipment is used.

Paragraph (l) requires stairways or mechanical escape facilities in escape shafts that are 50 feet or less in depth. If stairways are used, they must be made of concrete or metal, set at an angle not exceeding 45 degrees from the horizontal, and equipped on the open side with handrails. To facilitate escape, particularly during the transportation of disabled persons from the mine, the final rule requires platforms to be installed at intervals not to exceed 20 vertical feet in stairways. The platforms must be at least 2 feet by 4 feet and have handrails on open sides. Each of these requirements for stairways is retained without substantive change from existing § 75.1704–1.

Where shafts in designated escapeways are 5 feet or less in depth, the final rule, like the existing rule, allows a ladder to be used instead of stairways or mechanical facilities. As under the existing rule, ladders must be made of metal, anchored securely, and set at an angle of 60 degrees or less.

In slope or drift openings that are part of escapeways, paragraph (m) requires travelways to be designed to prevent slippage during escape. Such travelways are not required if mechanical escape facilities are used.

Section 75.381 Escapeways; Anthracite Mines

This section, derived from existing §§ 75.1704, 75.1704–1, 75.1704–2, and 75.1707, establishes requirements for escapeways for anthracite mines.

Commenters objected to the proposed escapeway provisions, stating that compliance with many of these provisions would not be possible in anthracite mines. Anthracite mines are notable for conditions and terminology distinct from most bituminous and lignite mines. Mining in anthracite mines is mostly done without electric face equipment or the types of permanent installations used in bituminous mines. In most anthracite mines, the direction of mining is typically vertical rather than horizontal, following the coal seam up steep pitches. Generally, anthracite mines are ventilated with one intake air course called a gangway and one return air course called a monkey.

In recognition of the distinct conditions of anthracite mines and in response to comments on the proposal, the final rule establishes separate escapeway requirements for anthracite mines. Since anthracite mines were not separately addressed in the proposal, §§ 75.381 through 75.385 of the proposal are now renumbered as §§ 75.382 through 75.386 in the final rule.

Paragraph (a) requires two separate and distinct passageways to be designated as escapeways in anthracite mines and paragraph (b) requires that these escapeways be provided from each working section continuous to the surface.

Paragraph (c) requires that each escapeway be maintained in a safe condition to always ensure the passage of anyone, including disabled persons, and that each escapeway be clearly marked to show the route of travel to the surface. Because mining in anthracite mines is conducted on steep pitches, often the coal face is actually the mine "roof." Under these circumstances, the meaning of the terms "height" and "width" with respect to the escapeways may be less clear than in bituminous and lignite mines. Rather than rely on these terms, paragraph (c)(3) requires escapeways in anthracite mines to be maintained to dimensions of at least 4 feet by 5 feet (the normal dimensions of return air courses in many anthracite mines). However, if the pitch or thickness of the coal seam does not permit these dimensions to be maintained, the dimensions of the escapeways must be specified in the approved ventilation plan.

Other general requirements for escapeways in anthracite mines are like those for bituminous and lignite mines. Under paragraph (c) escapeways must be provided with ladders, stairways, ramps, or similar facilities where the escapeways cross over obstructions. Also, paragraph (d) requires surface openings to be adequately protected to prevent surface fires, fumes, smoke, and flood water from entering the mine.

The final rule simplifies the requirements for the primary and alternate escapeways in anthracite mines, recognizing that most mines are ventilated by a single intake and single

return with little or no permanent electrical equipment, compressors, or diesels, since these types of equipment are not used in anthracite mines. The final rule therefore does not set requirements for a smoke-free primary intake escapeway, since nearly all escapeways in anthracite mines are currently free of most fire sources. Paragraph (e) requires the primary escapeway to be in intake air. Paragraph (f) requires the primary escapeway to be separated from the alternate escapeway for its entire length.

Paragraphs (g), (h), and (i) include requirements similar to those in paragraphs (i), (j), and (k) of § 75.380. Paragraph (g) requires mechanical facilities to be provided for each shaft or slope opening that is part of a primary escapeway. In most anthracite mines, such openings are normally the main routes of travel in and out of the mine. Paragraph (h) requires that within 30 minutes after mine personnel on the surface have been notified of an emergency requiring evacuation, mechanical escape facilities must be operational at the bottom of each shaft and slope opening. To enable this to occur, paragraph (i) requires the bottom of each shaft and slope opening that is part of a primary escapeway to be equipped with a means of signalling a surface location where a person is always on duty when persons are underground. Paragraph (g) also requires that when this signal is activated or evacuation of personnel is necessary, persons on the surface must take action to ensure that mechanical escape facilities are available to miners underground within 30 minutes, as specified in paragraph (h). To help persons in the escapeways, paragraph (g) requires ladders or mechanical escape facilities to be installed in all slopes that are part of escapeways.

Section 75.382 Mechanical Escape Facilities

This new section establishes requirements for mechanical escape facilities installed in escapeways under §§ 75.380 and 75.381. Under § 75.380, these facilities will be used for escape in shafts deeper than 50 feet, slopes inclined more than 18 degrees from the horizontal, and slopes inclined more than 9 degrees that are longer than 1,000 feet. For anthracite mines, § 75.381 requires facilities in each shaft or slope opening that is part of a primary escapeway, and for slopes that are part of escapeways, unless ladders are installed. This section includes provisions in proposed § 75.381.

Paragraph (a) requires mechanical escape facilities to be provided with overspeed, overwind, and automatic stop controls. These safety features minimize the risk of hoisting accidents during escape that are caused by mechanical malfunctions. So that facilities can be stopped if necessary in an escape situation, paragraph (b) requires facilities with platforms, cages, or other devices in which persons are carried to be equipped with brakes that can stop the conveyance when fully loaded.

Paragraph (c) requires mechanical escape facilities to be examined weekly. One commenter suggested that examinations be required daily; however, the Agency believes that a weekly examination is sufficient to assure proper functioning of the facility. This weekly examination includes examination of automatic elevators used for emergency escape purposes. It may be conducted at the same time as the daily examination of hoisting equipment required by existing § 75.1400–3. The examination includes an examination of headgear, connections, links and chains. Also, the final rule requires that at least once each week, hoists be run by a qualified hoisting engineer through one complete cycle of operation to verify that the facility is operational in an emergency requiring escape.

Commenters objected to paragraph (d) of the proposal, which would have required that a qualified hoisting engineer "be on duty" while any person is underground unless the facilities are operated automatically. The commenters stated that this proposed provision would conflict with § 75.380, which requires that mechanical escape facilities be operational at the bottom of shaft, slope, and drift openings within 30 minutes after personnel on the surface are notified of an emergency requiring evacuation. MSHA agrees and has made paragraph (d) consistent with § 75.380(j). Accordingly, under paragraph (d), a person trained to operate the mechanical hoist facility always must "be available" while any one is underground to send mechanical escape facilities to the bottom of each shaft and slope opening that is part of an escapeway within 30 minutes after personnel on the surface have been notified of an emergency requiring evacuation. As proposed, the final rule clarifies that no operator is required when automatically operated cages, platforms, or elevators are used. The change in the final rule to require a person trained to operate the mechanical hoist facility instead of the proposed certified hoisting engineer recognizes that MSHA currently has no method of certifying hoisting engineers and that if a person is trained he or she is capable of providing the necessary skills.

Paragraph (e) requires that escape facilities have rated capacities consistent with the loads handled. This prevents accidents from occurring due to failure of an overloaded escape facility. Paragraph (f) requires that manually operated facilities have indicators that reliably and accurately indicate the position of the facility. This enables the surface operator of the facility always to be aware of its location while persons are being transported.

Section 75.383 Escapeway Maps and Drills

This section, derived from existing § 75.1704–2, specifies requirements for escapeway maps and drills. These requirements ensure that miners are familiar with mine escape routes so that if escape is necessary, miners can reach the surface as quickly as possible. This section was proposed as § 75.382.

Paragraph (a) requires operators to maintain two types of escapeway maps. One map must be posted in each working section to show the designated escapeways from the working section to a location where miners must travel to meet the escapeway drill requirement in paragraph (b)(1). A second map showing the main escapeways must be posted at a surface location of the mine where miners congregate; that is, near the mine bulletin board, bathhouse, or waiting room. Posting maps at one of these locations gives miners the opportunity to become familiar with their escape routes.

All maps must be kept up to date. Therefore, any changes in the route of travel, locations of doors, or airflow direction must be shown on the map by the end of the shift on which changes are made so that during a mine emergency miners do not react based on inaccurate information. Similarly, after changes are made, the final rule requires miners to be informed of the changes before they enter the mine. Commenters differed in their opinion on this requirement; some commenters suggested that requiring posting of changes by the end of the shift on which they are made is unrealistic while another commenter suggested that changes be posted immediately. The Agency believes that posting the changes as proposed and as maintained in the final rule provides a reasonable time frame while providing necessary protection to miners.

Paragraph (b)(1) retains the existing requirement that each miner participate in a practice escapeway drill at least once every 90 days. In a clarifying change, the final rule adopts a commenter's suggestion to indicate more precisely the required distance to be traveled during this drill. Thus, the final rule requires that miners travel from the working section to the area where the split of air ventilating the working section intersects a main air course or for a distance of 2,000 feet outby the section loading point, whichever distance is greater. For miners whose working stations are outby or off the working section, travel from the section may not effectively familiarize them with their escape routes. Therefore, the final rule requires miners not working on sections to be drilled on escapeways from their work stations in the primary or alternate escapeway for a distance of 2,000 feet toward the nearest escape facility or drift opening. In response to a commenter who suggested that miners should be familiar with all routes off the section, paragraph (b)(2) provides that escapeway drills may not be conducted in the same escapeway as the immediately preceding drill.

At least once every 6 weeks and for each shift, paragraph (b)(2) requires at least 2 miners on each coal-producing section who normally work on that section to participate in a practice escapeway drill. These miners must travel escapeways from the section, accompanied by the section supervisor. The drill is to start at the location where the drill required for miners on the working section in paragraph (b)(1) ends and is complete when the miners reach the surface, mechanical escape facilities, or an underground entrance to a shaft, slope, or drift opening to the surface. This drill is retained from existing § 75.1704–2. It is necessary so that if the supervisor is absent from work when a mine emergency occurs or is performing duties at a location not on the section, there is a greater likelihood that other miners on the working section will be available and will be familiar with the escape routes to the surface. Consistent with this purpose, this drill must be conducted for each shift and miners who normally work on the section are required to be drilled. Also, so that the same miners on each shift are not designated to perform the drill each 6 weeks and in recognition of a commenter's suggestion that all miners need to become familiar with all of the escape routes, the final rule requires systematic rotation of section personnel so that all miners participate in this drill. Additionally, for the same reason, escapeway drills may not be conducted in the same escapeway as the immediately preceding drill.

In light of the commenter's recommendation that all miners need to be aware of all escape routes, the final rule requires in paragraph (b)(3) that at least once every 6 weeks, at least two miners on each maintenance shift and a supervisor participate in a practice escapeway drill similar to that required for persons on working sections under paragraph (b)(2). Like the drill required under paragraph (b)(2), this drill is required to be rotated between personnel and between escapeways.

Under paragraph (b)(4), the final rule requires that before or during escapeway drills miners must be informed of the locations of fire doors, check curtains, and controls designed to slow the travel of smoke such as smoke-retarding doors, changes in routes of travel, and plans for diverting smoke from escapeways. During mine emergencies, especially fire situations, it may be necessary to use such devices to change ventilation to divert air from a fire or smoke from escapeways.

Paragraph (c) allows the escapeway drills to satisfy the fire drill and evacuation requirements of existing § 75.1101–23. This provision retains the existing § 75.1402–2(f) because the escape routes traveled during the escapeway drills are those used for all mine emergencies requiring evacuation, including mine fires.

Section 75.384 Shortwall and Longwall Travelways

This new section requires a travelway to be provided on the tailgate side of longwall or shortwall panels when both escapeways required by § 75.380 are on the headgate side of the longwall or shortwall. Safe passage off both sides of a longwall or shortwall panel is essential for safe escape in emergencies. Therefore, a travelway must be on the side of the block of coal opposite the escapeways, and it must follow the most direct and safe practical route to an escapeway. This section was proposed as § 75.383.

Currently, longwalls have face widths of about 400 to 1,000 feet, and generally the escapeways start at the loading point in the headgate entries. As MSHA's two-entry longwall mining report indicated, safe travel across a longwall face to the headgate entries may not be possible if an emergency occurs in the headgate area. In this situation, an unobstructed travelway through the tailgate entries is necessary to prevent trapping miners in face areas without a means of escape.

MSHA recognizes that the tailgate side of a longwall or shortwall is an area generally subjected to extensive geologic stress during mining and that ground failures are likely to occur in tailgate entries. Therefore, the final rule does not require the travelway always to be located in the tailgate entry immediately adjacent to the panel. This permits a route avoiding obstructions through other tailgate entries to be established if this route is the most direct and safe practical route to an escapeway. Under paragraph (b), the route of travel must be clearly marked.

Paragraph (c) establishes procedures to be followed if a roof fall or other blockage occurs in the travelway that prevents safe travel off the panel. In response to comments, the final rule requires mining to cease when a blockage occurs, a procedure also recommended in MSHA's two-entry task force report. This provision reduces the likelihood of miners becoming trapped on the longwall section if an emergency develops on the headgate side of the panel, thus preventing escape through the escapeways. After mining ceases, miners must be withdrawn to a safe area outby the section loading point, and MSHA must be notified immediately. Before mining is resumed or cleanup of the blockage begins, the procedures required by §§ 75.215 and 75.222 which address roof control, must be implemented. Commenters suggested the cross-reference to the applicable roof control standards to clarify the relationship between this provision and the roof control requirements. Sections 75.215 and 75.222 generally address procedures for supporting tailgate entries and set guidelines for roof control plan procedures necessary to protect miners if a ground failure occurs in a longwall travelway.

A commenter suggested that the final rule should require an escapeway off the tailgate side of longwalls ventilated with intake air. MSHA disagrees. Under § 75.380, escapeways must meet minimum requirements for height, width, and other factors. Roof support required to maintain tailgate entries open may limit entry clearances to the extent that it is impossible to meet escapeway dimension requirements. Also, because of the different conditions and ventilation methods used to provide adequate ventilation of longwalls and associated gob areas it is not always possible or even advisable to have an intake on the tailgate side of the longwall.

Section 75.385 Opening New Mines

This section retains the requirements in existing § 75.1705 without change and states that when new mines are opened, not more than 20 miners can be allowed in the mine until a connection is made between mine openings. This minimizes exposing persons to hazards in the initial stages of mine development when two escapeways continuous to the surface cannot be provided. The final rule requires connections to be made between mine openings to provide two escapeways as soon as possible.

Section 75.386 Final Mining of Pillars

This section retains existing § 75.1706 without change and addresses final mining of pillars. Similar to § 75.385, this provision applies to a mining situation in which two escapeways to the surface cannot be provided. Final mining of pillars is conducted during the close-out period of a mine. The final rule permits no more than 20 miners in the mine during this period and requires that the distance between the mine opening and the working face be no longer than 500 feet.

Section 75.388 Boreholes in Advance of Mining

This section revises and clarifies existing § 75.1701 and retains requirements that boreholes be drilled: (1) When an advancing working place approaches within 50 feet of any area in the mine that has been surveyed and certified by a registered engineer or registered surveyor, unless the area has been preshift examined; (2) within 200 feet of any area in the mine that has not been surveyed by a registered engineer or a registered surveyor, unless the area has been preshift examined; or (3) within 200 feet of any mine working of any adjacent mine located in the same coalbed that has not been preshift examined. The existing rule requires that boreholes be drilled when mining near an area which cannot be inspected. The final rule clarifies this to mean any area which has not been preshift examined.

Inaccessible areas of a mine can present several hazards to active workings when mining proceeds inadvertently or improperly into these areas. Inaccessible areas may contain potentially dangerous accumulations of gases or water, which could result in explosions or inundations.

To increase the likelihood of detecting potential hazards when boreholes are drilled, paragraph (b) includes requirements for the pattern of drilling and the length of the holes. Boreholes must be drilled into the working face, parallel to the rib and within three feet of each rib. Additional holes must be drilled not more than 8 feet apart across the face. The final rule retains the existing requirement for boreholes to be drilled at least 20 feet in depth in advance of the face and to be always maintained to a distance of at least 10 feet in advance of the face as mining continues.

Like the existing rule, paragraph (c) specifies requirements for drilling into at least one rib of advancing working places to detect potential hazards in inaccessible areas not directly ahead of the direction of advance. These boreholes must be drilled at angles of 45 degrees to the direction of advance, at least 20 feet deep, and at intervals not exceeding 8 feet.

Paragraph (d) is new and establishes procedures to be followed if a borehole penetrates an inaccessible area. Under these circumstances, as proposed, the final rule requires tests to be made to determine the direction of airflow in the borehole, the pressure differential between the active workings and the penetrated area, the concentration of methane, oxygen, carbon monoxide, and carbon dioxide, and whether water is impounded within the penetrated area. Paragraph (e) specifies the circumstances under which the borehole must be plugged. Wooden plugs or similar devices are required unless action is taken to dewater or ventilate penetrated areas, and one of three conditions is present. One condition is when tests conducted at boreholes indicate that the atmosphere in the penetrated area contains a hazardous concentration of gas, such as methane, and carbon monoxide, or is deficient in oxygen. Another condition is when tests for methane, oxygen, carbon monoxide, and carbon dioxide concentrations cannot be made because air from active workings is flowing into the penetrated area through the borehole. A third condition is when water is discharging from the penetrated area into mine workings through the boreholes.

To protect miners from inundations of overlying water, a commenter suggested that the final rule should also address procedures for mining in an area under a seam previously mined and known to contain water. The commenter also noted that when mining is conducted over a previously mined area, methane can be liberated from cracks in the overlying mine's floor, and water can migrate into the overlying mine as well. MSHA agrees that hazardous conditions can be encountered when mining is conducted over or under other mines. However, the necessary procedures for drilling boreholes to protect miners from these hazards may vary from mine to mine depending on many factors, including the thickness of the strata between mines and whether dewatering or degassing can be conducted, as appropriate. To provide the flexibility necessary to address the required procedures in specific situations, a new provision, paragraph (f) specifies that whenever mining is to be conducted above or below an inaccessible area of another mine, boreholes must be drilled, as necessary, under a plan approved by the district manager. This provision allows precautions to be developed as needed when mining is conducted above or below other previously mined areas. Similarly, because conditions may vary, paragraph (g) permits alternatives to the borehole patterns required by paragraphs (b) and (c) if the alternative provides the same protection to the miners and is approved by the district manager.

Section 75.389 Mining Into Inaccessible Areas

This new section establishes procedures for mining into inaccessible areas. Unlike the proposal, the final rule requires that a separate plan be developed and approved by the district manager for mining into or through inaccessible areas. The proposal would have required procedures to be specified and approved in the ventilation plan. As discussed previously, because of the infrequency of this occurrence and the fact that two operations are seldom similar, the final rule, § 75.389, requires these procedures and precautions for such action to be included in a separate plan which must be approved by the district manager rather than be approved in the ventilation plan.

As proposed, paragraph (a) requires that when an area is penetrated by a borehole drilled under § 75.388, mining must cease and may not resume until conditions in the penetrated area can be determined and safe procedures are specified in a plan approved by the district manager for mining into or through the area. The final rule also requires a copy of the procedures for mining into the penetrated area to be posted near the site of the mine-through and requires an explanation of the procedures to be given to miners involved in the operation.

To address hazards that can be expected to be encountered in the penetrated area, paragraph (b) sets out the minimum requirements for the mining-through procedures that must be included in the plan. The plan must specify the method of ventilation, the ventilation controls, and the necessary

air quantities and velocities for the affected working section and working place, and dewatering procedures to be used if the penetrated area contains water accumulations. Any additional procedures or precautions that will be followed to protect those involved in the mine-through operation must also be included in the plan.

Paragraph (c) requires air quality tests to be conducted by certified persons prior to and during mining-through operations, at intervals and locations necessary to protect miners. Also, only those persons involved in the mining-through operation are permitted in the mine, and an examination of affected areas by a certified person after the operation is completed is required before persons re-enter the mine.

Other Existing Sections Affected

Several existing provisions contained in 30 CFR part 70 (mandatory health standards for underground coal mines) and part 75 (mandatory safety standards for underground coal mines) refer to specific ventilation standards that are the subject of this rule. These provisions have been revised in the final rule so that the reference is to the appropriate section of the final rule rather to the existing standard. The existing provisions affected and the revisions are: Section 70.2(e), the definition for "designated area" referring to § 75.316, is updated to refer to § 75.371(t); § 70.208(e) dealing with locations for designated area samples referring to § 75.316, is updated to refer to § 75.371(t); § 75.1103–4(e) and § 75.1103–7(b) dealing with automatic fire sensor and warning device systems refer to § 75.321, are updated to refer to § 75.313; and, § 75.1721 (b)(7) and (b)(8) dealing with preliminary mine plans, refer to §§ 75.316–1, 75.316–2 and 75.330–1 and are updated to refer to §§ 75.371 and 75.372. Also, §§ 75.1801 through 75.1805, dealing with records of examinations, are removed.

Petitions for Modification

Operators with petitions for modification that involve the standards revised in this rulemaking need to determine the status of those petitions before the effective date of this final rule. If there are sections of this rule that are renumbered but remain substantively unchanged from the existing standards, operators with modifications granted for these standards need not reapply. However, operators with petitions for modifications granted for standards that have been revised must comply with the new rule on its effective date. New petitions for modification of the final rule may be submitted under 30 CFR part 44. If Agency assistance is needed, questions should be directed to the appropriate MSHA district office.

Metrication

The final rule has been prepared using the inch-pound system of measurement (English system) instead of the SI (metric) system. However, the Agency remains committed to accomplishing an orderly transition to the SI system. The following table is intended to aid in the conversion of the final rule to metric units.

Quantity	From	To	Multiply by
Length	Inches	Centimeters	2.54
	Feet	Meters	0.304
Area	Square feet	Square meters	0.093
Velocity	Feet/minute	Meters/second	0.005
Pressure	Lbs/sq.in	Kilopascals	6.895
	Lbs/sq.ft.	Kilopascals	0.049
Air Quantity	Cu. ft./min.	Cu. meters/sec.	0.00047
Power	Horsepower	Kilowatts	0.746
Temperature	Degrees F	Degrees C	$T_c=(T_f-32)/1.8$

Derivation Table

The following derivation table cross references the final rule with the existing standard numbers from which it is derived.

New section	Old section
75.300	New.
75.301	New.
75.302	Partly new, 75.300.
75.310(a)	Partly new, 75.300–2 (a)(1) through (a)(3), (b) (1) and (2).
75.310(b) (1) and (2)	Partly new, 75.300–2(c).
75.310(c)	Partly new, 75.300–2(a)(3).
75.310(d)	75.300–2(b) (1) and (2).
75.310(e)	75.300–2(b)(2).
75.310(f)	75.300–2 (d) and (e).
75.311(a)	Partly new, 75.300, 75.300–3 (a)(1) and (a)(3).
75.311(b)	Partly new, 75.300–3(a)(1).
75.311(c)	New.
75.311(d)	75.300–3(b).
75.311(e)	75.300–2(a)(3).
75.311(f)	Partly new, 75.300–2(f).
75.311(g)	75.300–3(c).
75.311(h)	New.
75.312(a)	Partly new, 75.300, 75.300–4 (a) and (b).
75.312(b)	New.
75.312(c)	New.
75.312(d)	Partly new, 75.300–4(c).
75.312(e)	75.300–4(b).
75.312(f)	New.
75.312(g)	Partly new, 75.300, 75.300–4(d).
75.312(h)	75.300–4(e).
75.313(a)	Partly new, 75.302–4(b), 75.321.
75.313(b)	Partly new, 75.321, 75.321–1.
75.313(c)	Partly new, 75.321, 75.321–1.
75.313(d)	Partly new, 75.321, 75.321–1.
75.313(e)	New.
75.320(a)	Partly new, 75.303, 75.304, 75.304–3, 75.305–2, 75.307, 75.307–1, 75.308–2, 75.309(a), 75.309–1, 75.310–2, 75.314, 75.314–1, 75.315–1, 75.317.
75.320(b)	Partly new, 75.303, 75.304, 75.314, 75.317.
75.320(c)	Partly new, 75.303–2.
75.320(d)	Partly new, 75.303, 75.304, 75.314.
75.321(a)	75.301.
75.321(b)	75.301–5.
75.322	75.301–2.
75.323(a)	Partly new, 75.308, 75.309–2, 75.310–3.
75.323(b)	Partly new, 75.308, 75.316–2(d), 75.326.
75.323(c)	75.309, 75.309–2.
75.323(d)	Partly new, 75.310, 75.310–3.
75.323(e)	75.316–2, 75.329, 75.316–2(h).
75.324	Partly new, 75.322.
75.325(a)(1)	Partly new, 75.301, 75.301–1.
75.325(a)(2)	Partly new, 75.301–3.
75.325(a)(3)	Partly new, 75.302–4(g).
75.325(b)	Partly new, 75.301, 75.301–3.
75.325(c)	New.
75.325(d)	New.
75.325(e)	75.301.
75.326	Partly new, 75.301–4(a).
75.327	75.327, 75.327–1.
75.330(a)	75.302(c), 75.302–3.
75.330(b)	Partly new, 75.302(a) 75.302–1.
75.331(a)	Partly new, 75.302–4(a).
75.331(b)	Partly new, 75.302–4(c).
75.331(c)	Partly new, 75.302–4(e).
75.331(d)	Partly new, 75.302–4 (b), (c), (d) and (f).
75.332(a)	Partly new, 75.319, 75.319–1.

New section	Old section
75.332(b)	Partly new, 75.311, 75.312, 75.312–1.
75.333(a)	New.
75.333(b)	Partly new, 75.316–2(b), 75.326, 75.1707.
75.333(c)	New.
75.333(d)	New.
75.333(e)	Partly new, 75.316–2(b).
75.333(f)	New.
75.333(g)	Partly new, 75.316–2(c).
75.334(a)	Partly new, 75.329.
75.334(b)	Partly new, 75.316–2(e), 75.329.
75.334(c)	Partly new, 75.316–1(b)(5), 75.316–2 (e) and (f).
75.334(d)	New.
75.334(e)	Partly new, 75.330.
75.334(f)	New.
75.335	New.
75.340(a)	Partly new, 75.1105.
75.340(b)	New.
75.341	New.
75.342(a)	Partly new, 75.313, 75.313–1.
75.342(b)	Partly new, 75.313.
75.342(c)	Partly new, 75.313.
75.343	Partly new, 75.1105.
75.344	Partly new, 75.1105.
75.350	75.326.
75.351	New.
75.352	75.316–2(b), 75.326.
75.360(a)	75.303 (a) and (b).
75.360(b)	Partly new, 75.303(a).
75.360(c)	Partly new, 75.301–3, 75.303, 75.303–1.
75.360(d)	75.303(a).
75.360(e)	75.303(a).
75.360(f)	75.303(a).
75.360(g)	75.303(a), 75.323.
75.360(h)	Partly new, 75.303(a).
75.361(a)	Partly new, 75.301–3, 75.314.
75.361(b)	Partly new, 75.303(a).
75.362(a)	Partly new, 75.304, 75.304–2.
75.362(b)	Partly new, 75.303(a), 75.304(a).
75.362(c)	Partly new, 75.301–(b), 75.303–1, 75.303–1 (a), (b) and (c).
75.362(d)	Partly new, 75.304, 75.307, 75.307–1.
75.362(e)	75.302–4(a).
75.362(f)	Partly new, 75.309(a).
75.362(g)	New.
75.362(h)	New.
75.364(a)	Partly new, 75.305, 75.305–1, 75.316–2(f).
75.364(b)	Partly new, 75.305, 75.1704–2(c).
75.364(c)	Partly new, 75.305, 75.305–1, 75.306, 75.306–2.
75.364(d)	Partly new, 75.305, 75.323.
75.364(e)	New.
75.364(f)	New.
75.364(g)	75.305, 75.316–2(f).
75.364(h)	75.305, 75.306, 75.323.
75.364(i)	Partly new, 75.305.
75.370(a)	Partly new, 75.316, 75.316–2.
75.370 (b) through (e)	New.
75.370(f)	75.316.
75.370(g)	New.
75.371(a)	New.
75.371(b)	New.
75.371(c)	New.
75.371(d)	New.
75.371(e)	New.
75.371(f)	Partly new, 75.316–1.
75.371(g)	75.301.
75.371(h)	New.
75.371(i)	New.
75.371(j)	Partly new, 75.302–4(g).
75.371(k)	75.301–4.
75.371(l)	75.302–1(a).
75.371(m)	75.301.
75.371(n)	New.
75.371(o)	New.
75.371(p)	New.
75.371(q)	New.
75.371(r)	New.
75.371(s)	New.
75.371(t)	Partly new, 75.316–1(b).
75.371(u)	Partly new, 75.316–1(b).
75.371(v)	75.316–1(a), 75.327–1.
75.371(w)	New.
75.371(x)	75.316–1(b).
75.371(y)	75.316–2(f).
75.371(z)	75.316–2(f).
75.371(aa)	75.316–1.
75.371(bb)	75.316–1.
75.371(cc)	New.
75.371(dd)	New.
75.371(ee)	New.
75.371(ff)	75.329–2.
75.371(gg)	New.
75.371(hh)	New.
75.371(ii)	New.
75.371(jj)	New.
75.372(a)	Partly new, 75.316–1.
75.372(b)	Partly new, 75.316–1, 75.330, 75.330–1.
75.372(c)	New.
75.373	75.325.
75.380(a)	75.1704.
75.380(b)	Partly new, 75.1704.
75.380(c)	New.
75.380(d)	Partly new, 75.1704, 75.1704–1(a), 75.1704–2(a), 75.1704–2(b).
75.380(e)	75.1704.
75.380(f)	Partly new, 75.1704.
75.380(g)	75.1707.
75.380(h)	New.
75.380(i)	Partly new, 75.1704–1.
75.380(j)	Partly new, 75.1704–1.
75.380(k)	New.
75.380(l)	Partly new, 75.1704–1.
75.380(m)	New.
75.381(a)	75.1704.
75.381(b)	75.1704.
75.381(c)	Partly new, 75.1704.
75.381(d)	75.1704.
75.381(e)	New.
75.381(f)	Partly new, 75.1704.
75.381(g)	New.
75.381(h)	New.
75.381(i)	New.
75.382(a)	New.
75.382(b)	New.
75.382(c)	New.
75.382(d)	75.1704–1.
75.382(e)	New.
75.382(f)	New.
75.383(a)	Partly new, 75.1704–2.
75.383(b)	Partly new, 75.1704–2.
75.383(c)	New.
75.384	New.
75.385	75.1705.
75.386	75.1706.
75.388	Partly new, 75.1701.
75.389	New.

Redesignation Table

The following redesignation table cross references the existing standard numbers with the final rule standard numbers.

Old section	New section
75.300	75.302, 75.311, 75.312(a), 75.312(g).
75.300–1	Removed.
75.300–2(a)(1)	75.310(a)(1).
75.300–2(a)(2)	75.310(a) (1) and (2).
75.300–2(a)(3)	75.310(a) (3) and (4), 75.310(c), 75.311(e).
75.300–2 (b)(1)	75.310(a) (5) and (6), 75.310(d).
75.300–2(b)(2)	75.310(a) (5) and (6), 75.310(d), 75.310(e) (1), (3) and (4).
75.300–2(c)(1)	75.310(b)(1).
75.300–2(c)(2)	75.310(b)(2).
75.300–2(d)	75.310(f).
75.300–2(e)	75.310(f).
75.300–2(f)	75.311(f).
75.300–3(a)(1)	75.311 (a) and (b).
75.300–3(a)(2)	Removed.
75.300–3(a)(3)	75.311(a).
75.300–3(b)	Partly removed, 75.311(d).
75.300–3(c)	75.311(g).
75.300–4(a)	75.312(a).
75.300–4(b)	75.312 (a) and (e).
75.300–4(c)	75.312(d).
75.300–4(d)	Partly removed, 75.312(g).
75.300–4(e)	75.312 (g) and (h).
75.300–4(f)	75.312(g).
75.301	75.321(a), 75.325 (a), (b) and (e).
75.301–1	75.325 (a)(1) and (e)(1).
75.301–2	75.322.
75.301–3	75.325(a)(2), 75.360 (c)(1) and (c)(3), 75.361(a), 75.362(c).
75.301–4(a)	75.326.
75.301–4(b)(1)	Removed.
75.301–4(b)(2)	Removed.
75.301–4(c)	Removed.
75.301–5	75.321(b).
75.301–6	Removed.
75.301–7	Removed.
75.301–8	Removed.
75.302(a)	Partly removed, 75.330 (b)(1).
75.302(b)	Removed.
75.302(c)	75.330(a).
75.302–1(a)	75.330(b) (1) and (2), 75.371(1).
75.302–1(b) (1) and (2).	Removed.
75.302–2	Removed.
75.302–3	75.330(a).
75.302–4(a)	Partly removed, 75.331(a), 75.362(e).
75.302–4(b)	75.313(a), 75.331 (c) and (d).
75.302–4(c)	75.331(d).
75.302–4(d)	75.331 (a)(3) and (d).
75.302–4(e)	Partly removed, 75.331(c).
75.302–4(f)	75.331(d).
75.302–4(g)	Partly removed, 75.325 (a)(3), 75.371(j).
75.303(a)	75.320, 75.360 (a) through (g), 75.361(b), 75.362(b).
75.303(b)	75.360(a).
75.303–1	75.360(c), 75.362(c).
75.303–2(a)	Removed.
75.303–2(b)	75.320(c).
75.303–2(c)	Removed.
75.304	75.320 (a), (b) and (d), 75.362 (a) and (d).
75.304–1	Removed.
75.304–2	75.362.
75.304–3	Partly removed, 75.320 (a), (b) and (d).
75.305	Partly removed, 75.364 (a) through (d) and (g) through (i).
75.305–1	75.364 (a), (b) and (c).
75.305–2	Partly removed, 75.320(a).

Old section	New section
75.306	Partly removed, 75.364(c), 75.364(h).
75.306–1	Removed.
75.306–2	75.364(c).
75.307	75.320(a), 75.362(d).
75.307–1	Partly removed, 75.320(a), 75.362(d).
75.308	Partly removed, 75.323 (a) and (b).
75.308–1	Removed.
75.308–2	Partly removed, 75.320(a).
75.309(a)	75.323(c), 75.362(f).
75.309(b)	75.323(c).
75.309–1	Partly removed, 75.320(a).
75.309–2	75.323 (a) and (c).
75.309–3	Removed.
75.309–4	75.362(g).
75.310	75.323(d).
75.310–1	Removed.
75.310–2	Partly removed, 75.320(a).
75.310–3	75.323 (a) and (d).
75.311	Partly removed, 75.320, 75.332(b).
75.311–1	Removed.
75.312	75.332(b), Partly removed.
75.312–1	75.332(b).
75.312–2	Removed.
75.313	75.342.
75.313–1	Partly removed, 75.320 (b) and (d), 75.342(a)(4).
75.314	Partly removed, 75.361(a).
75.314–1	Partly removed, 75.320(a).
75.315	Removed.
75.315–1	Partly removed, 75.320.
75.316	75.370 (a) and (f), 75.371, 75.371 (g) and (k), 75.372(b)(6).
75.316–1	Partly removed, 75.371 (f), (t), (u), (v), (x), (aa) and (bb), 75.372 (a) and (b).
75.316–2	Partly removed, 75.370(a).
75.316–2(a)	Removed.
75.316–2(b)	75.333 (b) and (e), 75.352.
75.316–2(c)	75.333(g).
75.316–2(d)	75.323 (b), (c)(1) and (e).
75.316–2(e)	Partly removed, 75.334 (b) and (c).
75.316–2(f)	Partly removed, 75.334 (c) and (d), 75.364 (a) and (g), 75.371 (y) and (z).
75.316–2(g)	Removed.
75.316–2(h)	75.323(e).
75.316–2(i)	Removed.
75.317	Partly removed, 75.320 (a) and (b).
75.318	Removed.
75.319	75.332(a).
75.319–1	75.332(a).
75.321	Partly removed, 75.313 (a) through (d).
75.321–1	75.313 (b) and (c).
75.322	75.324.
75.323	Partly removed, 75.360(g), 75.364 (d) and (h).
75.324	Removed.
75.325	75.373.
75.326	75.323(b), 75.333(b), 75.350, 75.352.
75.327	75.327.
75.327–1	75.327.
75.328	Removed.
75.329	75.323(e), 75.334 (a) and (b), 75.335.
75.329–1	Removed.
75.329–2	Partly removed, 75.371(ff).
75.330	Partly removed, 75.334(e), 75.372(b).
75.330–1(a)	Partly removed, 75.372(b).
75.330–1(b)	Removed.
75.1105	Partly removed, 75.340(a), 75.343, 75.344.
75.1701	75.388.
75.1704	75.380 (a), (b), (d), (e) and (i), 75.381 (a) through (d) and (f).
75.1704–1	75.380(j), 75.381, 75.382(d).
75.1704–1(a)	75.380(d), 75.381(c).
75.1704–1(b)	75.380(i)(1), 75.381(g), 75.382(d).
75.1704–1(c)	75.380(1).
75.1704–2(a)	Partly removed, 75.380(d).
75.1704–2(b)	75.380(d).
75.1704–2(c)	75.364(b).
75.1704–2(d)	75.383(a).
75.1704–2(e)	75.383(b).
75.1704–2(f)	75.383(c).
75.1705	75.385.
75.1706	75.386.
75.1707	75.333(b), 75.380(g).
75.1707–1	Removed.

III. Paperwork Reduction Act

The final rule reduces and simplifies existing recordkeeping requirements for preshift and other examinations. For each preshift examination, the examiner is required to certify by initials, date, and time for each area examined, that the proper preshift examination was made. Also, under the final rule, a record is required to be made of hazardous conditions and their locations, whether or not these conditions have been corrected during the preshift examination.

The rule retains the existing requirement that the mine foreman review and countersign records of examinations. The mine foreman continues to have the responsibility to know if hazards are corrected or not.

The existing rule contains extensive criteria for evaluating and approving ventilation plans. As a result, comprehensive and often complex ventilation plans are required for each mine. The approved ventilation plan required by the final rule addresses ventilation practices at the mine and must be suitable to mining conditions. It also clarifies the scope of the current plan by making mandatory existing criteria that in the Agency's experience are applicable to all mines. Additionally, revisions to approved ventilation plans are required to be submitted once a ventilation plan is approved.

The collection of information requirements contained in the final rule were submitted to the Office of Management and Budget (OMB) in accordance with Section 3504(h) of the Paperwork Reduction Act of 1980 (44 U.S.C. 35). OMB has approved these information requirements under the following control number: 1219–0088.

IV. Executive Order 12291 and Regulatory Flexibility Act

Executive Order 12291 requires that a Regulatory Impact Analysis (RIA) be performed for any rule that will have a $100 million or more annual effect on the economy or a major increase in costs or prices for consumers or individual industries. MSHA has determined that this final rule will not result in these effects. In order to justify this determination, MSHA has provided a final RIA (FRIA) for this rule. This FRIA is available from the MSHA docket office and is summarized below.

A. Population-at-risk

The final rule will affect 1,749 underground coal mines employing 76,525 miners. Of these underground coal mines, 896 were determined to be small mines employing a total of 9,082 miners and 853 were determined to be large mines employing a total of 67,443 miners. For purposes of this analysis, small mines are those employing fewer than 20 miners and large mines are those employing 20 or more miners.

Small mines employ an average of 10 miners per mine and generally are 1-section mines. Assuming the length of an average shift is 8 hours, MSHA estimated that 87 percent of these small mines operate 1 shift per day and 13 percent operate 2 shifts per day, for a total of 1,012 shifts. MSHA determined that these mines operate an average of 160 days a year, or 4 days per week for 40 weeks per year. They ventilate with 1 main mine fan and they shut down their fan when the mine is not working.

Large mines employ an average of 79 miners per mine and generally are 2- or 3-section mines. Assuming the length of an average shift is 8 hours, MSHA estimated that 15 percent of these large mines operate 1 shift per day, 38 percent operate 2 shifts per day, and 47 percent operate 3 shifts per day, for a total of 1,979 shifts. MSHA determined that these mines operate an average of 250 days a year, or 5 days per week for 50 weeks per year. As some of these mines ventilate with more than 1 main mine fan, MSHA determined that there are a total of 1,355 main mine fans at large underground mines. Unlike small mines, large mines operate their fans continuously, 365 days per year.

B. Benefits

The benefits of the final ventilation rule for underground coal mines are the lives saved and the injuries prevented by full compliance with the final rule. The primary benefit of the rule is the protection that the standards would provide to miners who would be

endangered by hazards related to methane accumulations and fires in underground coal mines. MSHA estimated that full compliance with the final rule could prevent about 6 fatalities, 2 injuries, and 2 non-injury accidents each year. However, there are about 70 annual non-injury accidents that would probably be prevented but cannot be definitively included due to incomplete information about the cause of the accidents. In addition, cases of coal worker's pneumoconiosis would be prevented.

C. Compliance Costs

In developing cost estimates, MSHA has taken into consideration industry wide safety practices. Current compliance costs are related to requirements for labor, equipment purchase and maintenance, and recordkeeping. MSHA has compared the costs associated with the final requirements with the costs of the existing requirements and is providing a summary of the incremental costs. MSHA estimated that in order to comply with the final ventilation rule, mine operators will incur a first-year cost of about $6,061,000 (about $3,500 per mine) or an annualized cost of about $1,528,000 (about $900 per mine). The annual cost of complying with the final rule will be about $17,244,000 (about $9,900 per mine) during the first year of compliance. This annual cost will increase by about $51,000 in the second year, about $615,000 in the third year, and about $666,000 in the fourth year in which it will stabilize at an annual cost of $17,910,000 (about $10,200 per mine).

D. Economic Impacts

MSHA's final ventilation rule will have a minimal impact upon labor productivity, will have little impact upon profits, will not involve an increase in prices, and will not affect mining output or mining employment. MSHA believes there will be no detrimental economic impact to this industry.

E. Regulatory Flexibility Certification

The Regulatory Flexibility Act requires that agencies evaluate and include, wherever possible, compliance alternatives that minimize any adverse impact on small businesses when developing regulatory standards. For purposes of the Regulatory Flexibility Act, MSHA has defined small business entities as mines with fewer than 20 employees. This rule includes alternative compliance methods, several of which would directly benefit small mining operations.

MSHA estimated that the first-year cost to small mines will be about $1,773,000 (about $2,000 per mine) and the annualized cost will be about $514,000 (about $600 per mine). The annual cost to small mines will be about $1,672,000 (about $1,900 per mine) during the first year of compliance. This annual cost will increase by about $13,000 in the second year, about $91,000 in the third year, and about $104,000 in the fourth year in which it will stabilize at an annual cost of $1,776,000 (about $2,000 per mine).

At the same time, MSHA estimated the first-year cost to large mines will be about $4,288,000 (about $5,000 per mine) and the annualized cost will be about $1,014,000 (about $1,200 per mine). The annual cost to large mines will be about $15,572,000 (about $18,300 per mine) during the first year of compliance. This annual cost will increase by about $38,000 in the second year, about $524,000 in the third year, and about $562,000 in the fourth year in which it will stabilize at an annual cost of $16,134,000 (about $18,900 per mine).

The lack of a substantial cost increase for small mines in conjunction with the fact that similar hazards exist in both large and small mining operations indicates that regulatory relief is not warranted for small mining operations. Therefore, the Assistant Secretary has determined that the ventilation rule will not have a significantly adverse impact upon a substantial number of small entities.

List of Subjects

30 CFR Part 70

Mine safety and health, Reporting and recordkeeping requirements.

30 CFR Part 75

Mine safety and health, Underground coal mines, Ventilation, Escapeways.

Accordingly, chapter I of title 30, Code of Federal Regulations, is amended as set forth below.

Dated: April 30, 1992.

William J. Tattersall,

Assistant Secretary for Mine Safety and Health.

Accordingly, parts 70 and 75, subchapter O, chapter I, title 30 of the Code of Federal Regulations are amended as follows:

PART 70—MANDATORY HEALTH STANDARDS—UNDERGROUND COAL MINES

1. The authority citation for part 70 is revised as follows:

Authority: 30 U.S.C. 811 and 813(h).

Subpart A—General

2. Section 70.2 is amended by revising the definition for designated area to read as follows:

§ 70.2 Definitions.

The following definition applies in this part.

* * * * *

Designated area. An area of a mine identified by the operator under § 75.371(t) (Mine ventilation plan; contents) of this title and approved by the district manager.

* * * * *

Subpart C—Sampling Procedures

3. Paragraph (e) of § 70.208 is revised to read as follows:

§ 70.208 Bimonthly sampling; designated areas.

* * * * *

(e) Designated area samples shall be collected at locations to measure respirable dust generation sources in the active workings. The approved mine ventilation plan contents required by § 75.371(t) of this chapter shall show the specific locations where designated area samples will be collected. Each designated area will be assigned a four-digit identification number by MSHA.

* * * * *

PART 75—MANDATORY SAFETY STANDARDS—UNDERGROUND COAL MINES

4. The authority citation for part 75 continues to read as follows:

Authority: 30 U.S.C. 811, 957, and 961.

Subpart A—General

5. Section 75.2 is revised to read as follows:

§ 75.2 Definitions.

The following definitions apply in this part.

Act. The Federal Mine Safety and Health Act of 1977.

Active workings. Any place in a coal mine where miners are normally required to work or travel.

Anthracite. Coals with a volatile ratio equal to 0.12 or less. The volatile ratio is the volatile matter content divided by the volatile matter plus the fixed carbon.

Certified or registered. As applied to any person, a person certified or registered by the State in which the coal mine is located to perform duties prescribed by this part 75, except that in a State where no program of certification or registration is provided or where the program does not meet at

least minimum Federal standards established by the Secretary, such certification or registration shall be by the Secretary.

Coal mine. Includes areas of adjoining mines connected underground.

Low voltage. Up to and including 660 volts, medium voltage means voltages from 661 to 1,000 volts; and high voltage means more than 1,000 volts.

Permissible. (1) As applied to electric face equipment, all electrically operated equipment taken into or used inby the last open crosscut of an entry or a room of any coal mine the electrical parts of which, including, but not limited to, associated electrical equipment, components, and accessories, are designed, constructed, and installed, in accordance with the specifications of the Secretary, to assure that such equipment will not cause a mine explosion or mine fire, and the other features of which are designed and constructed, in accordance with the specifications of the Secretary, to prevent, to the greatest extent possible, other accidents in the use of such equipment. The regulations of the Secretary or the Director of the Bureau of Mines in effect on March 30, 1970, relating to the requirements for investigation, testing, approval, certification, and acceptance of such equipment as permissible shall continue in effect until modified or superseded by the Secretary, except that the Secretary shall provide procedures, including, where feasible, testing, approval, certification, and acceptance in the field by an authorized representative of the Secretary, to facilitate compliance by an operator with the requirements of § 75.500 within the periods prescribed in § 75.500.

(2) As applied to equipment other than permissible electric face equipment: (i) Equipment used in the operation of a coal mine to which an approval plate, label, or other device is attached as authorized by the Secretary and which meets specifications which are prescribed by the Secretary for the construction and maintenance of such equipment and are designed to assure that such equipment will not cause a mine explosion or a mine fire. (ii) The manner of use of equipment means the manner of use prescribed by the Secretary.

Qualified person. As the context requires:

(1) An individual deemed qualified by the Secretary and designated by the operator to make tests and examinations required by this part 75; and

(2) An individual deemed, in accordance with minimum requirements to be established by the Secretary, qualified by training, education, and experience, to perform electrical work, to maintain electrical equipment, and to conduct examinations and tests of all electrical equipment.

Respirable dust. Dust collected with a sampling device approved by the Secretary and the Secretary of Health and Human Services in accordance with part 74—Coal Mine Dust Personal Sampler Units of this title. Sampling device approvals issued by the Secretary of the Interior and Secretary of Health, Education, and Welfare are continued in effect.

Rock dust. Pulverized limestone, dolomite, gypsum, anhydrite, shale, adobe, or other inert material, preferably light colored, 100 percent of which will pass through a sieve having 20 meshes per linear inch and 70 percent or more of which will pass through a sieve having 200 meshes per linear inch; the particles of which when wetted and dried will not cohere to form a cake which will not be dispersed into separate particles by a light blast of air; and which does not contain more than 5 percent combustible matter or more than a total of 4 percent free and combined silica (SiO_2), or, where the Secretary finds that such silica concentrations are not available, which does not contain more than 5 percent of free and combined silica.

Secretary. The Secretary of Labor or the Secretary's delegate.

Working face. Any place in a coal mine in which work of extracting coal from its natural deposit in the earth is performed during the mining cycle.

Working place. The area of a coal mine inby the last open crosscut.

Working section. All areas of the coal mine from the loading point of the section to and including the working faces.

§ 75.1701 [Redesignated as § 75.388]

6. Section 75.1701 of subpart R is redesignated and revised as § 75.388, the text of which appears in subpart D below.

§§ 75.1704, 75.1704–1, 75.1704–2, 75.1707 [Redesignated as §§ 75.380–75.383]

7. Sections 75.1704, 75.1704–1, 75.1704–2 and 75.1707 of subpart R are redesignated and revised as §§ 75.380, 75.381, 75.382 and 75.383, the text of which appears in subpart D below.

§ 75.1705 [Redesignated as § 75.385]

8. Section 75.1705 of subpart R is redesignated as § 75.385, the text of which appears in subpart D below.

§ 75.1706 [Redesignated as § 75.386]

9. Section 75.1706 of subpart R is redesignated as § 75.386, the text of which appears in subpart D below.

10. Subpart D is revised to read as follows:

Subpart D—Ventilation

Sec.

75.300 Scope.
75.301 Definitions.
75.302 Main mine fans.
75.310 Installation of main mine fans.
75.311 Main mine fan operation.
75.312 Main mine fan examinations and records.
75.313 Main mine fan stoppage with persons underground.
75.320 Air quality detectors and measurement devices.
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75.351 Atmospheric monitoring system (AMS).
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75.371 Mine ventilation plan; contents.
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75.381 Escapeways; anthracite mines.
75.382 Mechanical escape facilities.
75.383 Escapeway maps and drills.
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75.385 Opening new mines.
75.386 Final mining of pillars.
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75.389 Mining into inaccessible areas.

Subpart D—Ventilation

§ 75.300 Scope.

This subpart sets requirements for underground coal mine ventilation.

§ 75.301 Definitions.

In addition to the applicable definitions in § 75.2, the following definitions apply in this subpart.

Air course. An entry or a set of entries separated from other entries by stoppings, overcasts, other ventilation control devices, or by solid blocks of coal or rock so that any mixing of air currents between each is limited to leakage.

Incombustible. Incapable of being burned.

Intake air. Air that has not yet ventilated the last working place on any split of any working section, or any worked-out area, whether pillared or nonpillared.

Intrinsically safe. Incapable of releasing enough electrical or thermal energy under normal or abnormal conditions to cause ignition of a flammable mixture of methane or natural gas and air of the most easily ignitable composition.

Noncombustible Structure or Area. Describes a structure or area that will continue to provide protection against flame spread for at least 1 hour when subjected to a fire test incorporating an ASTM E119–88 time/temperature heat input, or equivalent.

Noncombustible Material. Describes a material which when used to construct a ventilation control results in a control that will continue to serve its intended function for 1 hour when subjected to a fire test incorporating an ASTM E119–88 time/temperature heat input, or equivalent.

Return air. Air that has ventilated the last working place on any split of any working section or any worked-out area, whether pillared or nonpillared. If air mixes with air that has ventilated the last working place on any split of any working section or any worked-out area, whether pillared or nonpillared, it is considered return air. For the purposes of existing § 75.507–1, air that has been used to ventilate any working place in a coal producing section or pillared area, or air that has been used to ventilate any working face if such air is directed away from the immediate return is return air.

Worked-out area. An area where mining has been completed, whether pillared or nonpillared, excluding developing entries, return air courses, and intake air courses.

§ 75.302 Main mine fans.

Each coal mine shall be ventilated by one or more main mine fans. Booster fans shall not be installed underground to assist main mine fans except in anthracite mines. In anthracite mines, booster fans installed in the main air current or a split of the main air current may be used provided their use is approved in the ventilation plan.

§ 75.310 Installation of main mine fans.

(a) Each main mine fan shall be—

(1) Installed on the surface in an incombustible housing;

(2) Connected to the mine opening with incombustible air ducts;

(3) Equipped with an automatic device that gives a signal when the fan either slows or stops. The signal from this device shall be placed so that it will be seen or heard by a responsible person who is always on duty when persons are underground;

(4) Equipped with a pressure recording device or a main mine fan monitoring system, except that mines permitted to shut down main mine fans under § 75.311 may use an alternative device for monitoring main mine fan pressure provided it is approved in the ventilation plan;

(5) Protected by one or more weak walls or explosion doors, or a combination of weak walls and explosion doors, located in direct line with possible explosive forces;

(6) Except as provided under paragraph (e) of this section, offset by at least 15 feet from the nearest side of the mine opening unless an alternative method of protecting the fan and its associated components is approved in the ventilation plan; and

(b)(1) If an electric motor is used to drive a main mine fan, the motor shall operate from a power circuit independent of all mine power circuits.

(2) If an internal combustion engine is used to drive a main mine fan—

(i) The fuel supply shall be protected against fires and explosions;

(ii) The engine shall be installed in an incombustible housing and be equipped with a remote shutdown device;

(iii) The engine and the engine exhaust system shall be located out of direct line of the air current exhausting from the mine; and

(iv) The engine exhaust shall be vented to the atmosphere so that the exhaust gases do not contaminate the mine intake air current or any enclosure.

(c) If a main mine fan monitoring system is used under § 75.312, the system shall record mine ventilating pressure and monitor bearing temperature, revolutions per minute, vibration, electric voltage, and amperage. The system also shall be equipped with an automatic device that signals a surface location when—

(1) An electrical or mechanical deficiency exists in the monitoring system; or

(2) A sudden increase or loss in mine ventilating pressure occurs.

(d) Weak walls and explosion doors shall have cross-sectional areas at least equal to that of the entry through which the pressure from an explosion underground would be relieved. A weak wall and explosion door combination shall have a total cross-sectional area at least equal to that of the entry through which the pressure from an explosion underground would be relieved.

(e) If a mine fan is installed in line with an entry, a slope, or a shaft—

(1) The cross-sectional area of the pressure relief entry shall be at least equal to that of the fan entry;

(2) The fan entry shall be developed out of direct line with possible explosive forces;

(3) The coal or other solid material between the pressure relief entry and the fan entry shall be at least 2,500 square feet; and

(4) The surface opening of the pressure relief entry shall be not less than 15 feet nor more than 100 feet from the surface opening of the fan entry and from the underground intersection of the fan entry and pressure relief entry.

(f) In mines ventilated by multiple main mine fans, incombustible doors shall be installed so that if any main mine fan stops and air reversals through the fan are possible, the doors on the affected fan automatically close.

§ 75.311 Main mine fan operation.

(a) Main mine fans shall be continuously operated, except as otherwise approved in the ventilation plan, or when intentionally stopped for testing of automatic closing doors and automatic fan signal devices, maintenance or adjustment of the fan, or to perform maintenance or repair work underground that cannot otherwise be made while the fan is operating.

(b) Except as provided in paragraph (c) of this section, when a main mine fan is intentionally stopped and the ventilating quantity provided by the fan is not maintained by a back-up fan system—

(1) Only persons necessary to evaluate the effect of the fan stoppage or restart, or to perform maintenance or repair work that cannot otherwise be made while the fan is operating, shall be permitted underground;

(2) Mechanized equipment shall be shut off before stopping the fan; and

(3) Electric power circuits entering underground areas of the mine shall be deenergized.

(c) When a back-up fan system is used that does not provide the ventilating quantity provided by the main mine fan,

persons may be permitted in the mine and electric power circuits may be energized as specified in the approved ventilation plan.

(d) Electrical or mechanical deficiencies in a main mine fan shall be repaired promptly and any unusual variance in the mine ventilating pressure shall be investigated immediately.

(e) While persons are underground, a responsible person designated by the operator always shall be at a surface location where each main mine fan signal can be seen or heard.

(f) The area within 100 feet of main mine fans and intake air openings shall be kept free of combustible material, unless alternative precautions necessary to provide protection from fire or other products of combustion are approved in the ventilation plan.

(g) If multiple mine fans are used, the mine ventilation system shall be designed and maintained to eliminate areas without air movement.

(h) Any atmospheric monitoring system operated during fan stoppages shall be intrinsically safe.

§ 75.312 Main mine fan examinations and records.

(a) Each main mine fan and its associated components, including devices for measuring or recording mine ventilation pressure, shall be examined for proper operation by a person designated by the operator at least once each day that the fan operates unless a functioning main mine fan monitoring system is used.

(b)(1) If a main mine fan monitoring system is used, a person designated by the operator shall, at least every 7 days—

(i) Test the monitoring system for proper operation; and

(ii) Examine each main mine fan and its associated components.

(2) If the monitoring system malfunctions, the malfunction shall be corrected, or paragraph (a) of this section shall apply.

(c) At least every 31 days, the automatic fan signal device for each main mine fan shall be tested by stopping the fan.

(d) At least every 31 days, automatic closing doors in multiple main mine fan systems shall be tested by stopping the fan.

(e) Circular main mine fan pressure recording charts shall be changed before the beginning of a second revolution.

(f) Certification. Persons making main mine fan examinations shall certify by initials and date at the fan or another location specified by the operator, that the examinations were made. Each certification shall identify the main mine fan examined.

(g)(1) Recordkeeping. By the end of the shift on which the examination is made, persons making main mine fan examinations shall record, in a book maintained for that purpose, uncorrected defects that may affect the operation of the fan that are not corrected by the end of that shift.

(2) At mines permitted to shut down main mine fans under § 75.311, if a pressure recording device is not used, a record shall be made, in a book maintained for that purpose, of the time and fan pressure immediately before the fan is stopped, and after the fan is restarted and the fan pressure stabilizes.

(3) By the end of the shift on which the monthly test of the automatic fan signal device or the automatic closing doors is completed, persons making these tests shall record the results in a book maintained for this purpose.

(h) Retention period. Records, including records of mine fan pressure, shall be retained at a surface location at the mine for at least 1 year and shall be made available for inspection by authorized representatives of the Secretary and representatives of miners.

§ 75.313 Main mine fan stoppage with persons underground.

(a) If a main mine fan stops while anyone is underground and the ventilating quantity provided by the fan is not maintained by a back-up fan system—

(1) Electrically powered equipment in each working section shall be deenergized;

(2) Other mechanized equipment in each working section shall be shut off; and

(3) Everyone shall be withdrawn from the working sections and areas where mechanized mining equipment is being installed or removed.

(b) If ventilation is restored within 15 minutes after a main mine fan stops, certified persons shall examine for methane in the working places and in other areas where methane is likely to accumulate before work is resumed and before equipment is energized or restarted in these areas.

(c) If ventilation is not restored within 15 minutes after a main mine fan stops—

(1) Everyone shall be withdrawn from the mine;

(2) Underground electric power circuits shall be deenergized, except that circuits that are necessary to withdraw persons from the mine shall be deenergized as persons are withdrawn; and

(3) Mechanized equipment not located on working sections shall be shut off unless the equipment is necessary to withdraw persons from the mine.

(d)(1) When ventilation is restored—

(i) No one shall enter any underground area of the mine until an examination of the area is completed by a certified person and the area is determined to be safe; and

(ii) Certified persons shall complete an examination for methane before underground power circuits are energized in an area.

(2) If ventilation is restored to the mine before miners reach the surface, the miners may return to underground working areas only after an examination of the areas is made by a certified person and the areas are determined to be safe.

(e) Any atmospheric monitoring system operated during fan stoppages shall be intrinsically safe.

§ 75.320 Air quality detectors and measurement devices.

(a) Tests for methane shall be made by a qualified person with MSHA approved detectors that are maintained in permissible and proper operating condition and calibrated with a known methane-air mixture at least once every 31 days.

(b) Tests for oxygen deficiency shall be made by a qualified person with MSHA approved oxygen detectors that are maintained in permissible and proper operating condition and that can detect 19.5 percent oxygen with an accuracy of ± 0.5 percent. The oxygen detectors shall be calibrated at the start of each shift that the detectors will be used.

(c) Handheld devices that contain electrical components and that are used for measuring air velocity, carbon monoxide, oxides of nitrogen, and other gases shall be approved and maintained in permissible and proper operating condition.

(d) Through August 15, 1995, a permissible flame safety lamp may be used to make tests for oxygen deficiency required by the regulations in this part. After August 15, 1995, an oxygen detector approved by MSHA shall be used for such tests and permissible flame safety lamps may only be used as a supplementary testing device.

§ 75.321 Air quality.

(a) Areas where persons work or travel shall be ventilated by air containing at least 19.5 percent oxygen and not more than 0.5 percent carbon dioxide, and the volume and velocity of the air current in these areas shall be sufficient to dilute, render harmless, and carry away flammable, explosive,

noxious, and harmful gases, dusts, smoke, and fumes.

(b) Notwithstanding the provisions of § 75.322, for the purpose of preventing explosions from gases other than methane, the following gases shall not be permitted to accumulate in excess of the concentrations listed below:

(1) Carbon monoxide (CO)—2.5 percent
(2) Hydrogen (H_2)—.80 percent
(3) Hydrogen sulfide (H_2S)—.80 percent
(4) Acetylene (C_2H_2)—.40 percent
(5) Propane (C_3H_8)—.40 percent
(6) MAPP (methyl-acetylene-propylene-propodiene)—.30 percent

§ 75.322 Harmful quantities of noxious gases.

Concentrations of noxious or poisonous gases, other than carbon dioxide, shall not exceed the current threshold limit values (TLV) as specified and applied by the American Conference of Governmental Industrial Hygienists. Detectors or laboratory analysis of mine air samples shall be used to determine the concentrations of harmful, noxious, or poisonous gases.

§ 75.323 Actions for excessive methane.

(a) *Location of tests.* Tests for methane concentrations under this section shall be made at least 12 inches from the roof, face, ribs, and floor.

(b) *Working places and intake air courses.* (1) When 1.0 percent or more methane is present in a working place or an intake air course, including an air course in which a belt conveyor is located, or in an area where mechanized mining equipment is being installed or removed—

(i) Except intrinsically safe atmospheric monitoring systems (AMS), electrically powered equipment in the affected area shall be deenergized, and other mechanized equipment shall be shut off;

(ii) Changes or adjustments shall be made to the ventilation system to reduce the concentration of methane to less than 1.0 percent; and

(iii) No other work shall be permitted in the affected area until the methane concentration is less than 1.0 percent.

(2) When 1.5 percent or more methane is present in a working place or an intake air course, including an air course in which a belt conveyor is located, or in an area where mining equipment is being installed or removed—

(i) Everyone except those persons referred to in section 104(c) of the Act shall be withdrawn from the affected area; and

(ii) Except for intrinsically safe AMS, electrically powered equipment in the affected area shall be disconnected at the power source.

(c) *Return air split.* (1) When 1.0 percent or more methane is present in a return air split between the last working place on a working section and where that split of air meets another split of air, or the location at which the split is used to ventilate seals or worked-out areas, changes or adjustments shall be made to the ventilation system to reduce the concentration of methane in the return air to less than 1.0 percent.

(2) When 1.5 percent or more methane is present in a return air split between the last working place on a working section and where that split of air meets another split of air, or the 245 location where the split is used to ventilate seals or worked-out areas—

(i) Everyone except those persons referred to in section 104(c) of the Act shall be withdrawn from the affected area;

(ii) Other than intrinsically safe AMS, equipment in the affected area shall be deenergized, electric power shall be disconnected at the power source, and other mechanized equipment shall be shut off; and

(iii) No other work shall be permitted in the affected area until the methane concentration in the return air is less than 1.0 percent.

(d) *Return air split alternative.* (1) The provisions of this paragraph apply if—

(i) The quantity of air in the split ventilating the active workings is at least 27,000 cubic feet per minute in the last open crosscut or the quantity specified in the approved ventilation plan, whichever is greater;

(ii) The methane content of the air in the split is continuously monitored during mining operations by an AMS that gives a visual and audible signal on the working section when the methane in the return air reaches 1.5 percent, and the methane content is monitored as specified in § 75.351; and

(iii) Rock dust is continuously applied with a mechanical duster to the return air course during coal production at a location in the air course immediately outby the most inby monitoring point.

(2) When 1.5 percent or more methane is present in a return air split between a point in the return opposite the section loading point and where that split of air meets another split of air or where the split of air is used to ventilate seals or worked-out areas—

(i) Changes or adjustments shall be made to the ventilation system to reduce the concentration of methane in the return air below 1.5 percent;

(ii) Everyone except those persons referred to in § 104(c) of the Act shall be withdrawn from the affected area;

(iii) Except for intrinsically safe AMS, equipment in the affected area shall be deenergized, electric power shall be disconnected at the power source, and other mechanized equipment shall be shut off; and

(iv) No other work shall be permitted in the affected area until the methane concentration in the return air is less than 1.5 percent.

(e) *Bleeders and other return air courses.* The concentration of methane in a bleeder split of air immediately before the air in the split joins another split of air, or in a return air course other than as described in paragraphs (c) and (d) of this section, shall not exceed 2.0 percent.

§ 75.324 Intentional changes in the ventilation system.

(a) A person designated by the operator shall supervise any intentional change in ventilation that—

(1) Alters the main air current or any split of the main air current in a manner that could materially affect the safety or health of persons in the mine; or

(2) Affects section ventilation by 9,000 cubic feet per minute of air or more in bituminous or lignite mines, or 5,000 cubic feet per minute of air or more in anthracite mines.

(b) Intentional changes shall be made only under the following conditions:

(1) Electric power shall be removed from areas affected by the ventilation change and mechanized equipment in those areas shall be shut off before the ventilation change begins.

(2) Only persons making the change in ventilation shall be in the mine.

(3) Electric power shall not be restored to the areas affected by the ventilation change and mechanized equipment shall not be restarted until a certified person has examined these areas for methane accumulation and for oxygen deficiency and has determined that the areas are safe.

§ 75.325 Air quantity.

(a)(1) In bituminous and lignite mines the quantity of air shall be at least 3,000 cubic feet per minute reaching each working face where coal is being cut, mined, drilled for blasting, or loaded. When a greater quantity is necessary to dilute, render harmless, and carry away flammable, explosive, noxious, and harmful gases, dusts, smoke, and fumes, this quantity shall be specified in the approved ventilation plan. A minimum air quantity may be required to be specified in the approved ventilation plan for other working places or working faces.

(2) The quantity of air reaching the working face shall be determined at or near the face end of the line curtain,

ventilation tubing, or other ventilation control device. If the curtain, tubing, or device extends beyond the last row of permanent roof supports, the quantity of air reaching the working face shall be determined behind the line curtain or in the ventilation tubing at or near the last row of permanent supports.

(3) If machine mounted dust collectors or diffuser fans are used, the approved ventilation plan shall specify the operating volume of the dust collector or diffuser fan.

(b) In bituminous and lignite mines, the quantity of air reaching the last open crosscut of each set of entries or rooms on each working section and the quantity of air reaching the intake end of a pillar line shall be at least 9,000 cubic feet per minute unless a greater quantity is required to be specified in the approved ventilation plan. This minimum also applies to sections which are not operating but are capable of producing coal by simply energizing the equipment on the section.

(c) In longwall and shortwall mining systems—(1) The quantity of air shall be at least 30,000 cubic feet per minute reaching the working face of each longwall, unless the operator demonstrates that a lesser air quantity will maintain continual compliance with applicable methane and respirable dust standards. This lesser quantity shall be specified in the approved ventilation plan. A quantity greater than 30,000 cubic feet per minute may be required to be specified in the approved ventilation plan.

(2) The velocity of air that will be provided to control methane and respirable dust below applicable standards on each longwall or shortwall and the locations where these velocities will be provided shall be specified in the approved ventilation plan. The locations specified shall be at least 50 feet but no more than 100 feet from the headgate and tailgate, respectively.

(d) Ventilation shall be maintained during installation and removal of mechanized mining equipment. The approved ventilation plan shall specify the quantity of air, the locations where this quantity will be provided and the ventilation controls required.

(e) In anthracite mines, the quantity of air shall be as follows:

(1) At least 1,500 cubic feet per minute reaching each working face where coal is being mined, unless a greater quantity is required to be specified in the approved ventilation plan.

(2) At least 5,000 cubic feet per minute passing through the last open crosscut in each set of entries or rooms and at the intake end of any pillar line, unless a greater quantity is required to be specified in the approved ventilation plan.

(3) When robbing areas where air currents cannot be controlled and air measurements cannot be obtained, the air shall have perceptible movement.

§ 75.326 Mean entry air velocity.

In exhausting face ventilation systems, the mean entry air velocity shall be at least 60 feet per minute reaching each working face where coal is being cut, mined, drilled for blasting, or loaded, and to any other working places as required in the approved ventilation plan. A lower mean entry air velocity may be approved in the ventilation plan if the lower velocity will maintain methane and respirable dust concentrations below the applicable levels. Mean entry air velocity shall be determined at or near the inby end of the line curtain, ventilation tubing, or other face ventilation control devices.

§ 75.327 Air courses and trolley haulage systems.

(a) In any mine opened on or after March 30, 1970, or in any new working section of a mine opened before that date, where trolley haulage systems are maintained and where trolley wires or trolley feeder wires are installed, an authorized representative of the Secretary shall require enough entries or rooms as intake air courses to limit the velocity of air currents in the haulageways to minimize the hazards of fires and dust explosions in the haulageways.

(b) Unless the district manager approves a higher velocity, the velocity of the air current in the trolley haulage entries shall be limited to not more than 250 feet per minute. A higher air velocity may be required to limit the methane content in these haulage entries or elsewhere in the mine to less than 1.0 percent and provide an adequate supply of oxygen.

§ 75.330 Face ventilation control devices.

(a) Brattice cloth, ventilation tubing and other face ventilation control devices shall be made of flame-resistant material approved by MSHA.

(b)(1) Ventilation control devices shall be used to provide ventilation to dilute, render harmless, and to carry away flammable, explosive, noxious, and harmful gases, dusts, smoke, and fumes—

(i) To each working face from which coal is being cut, mined, drilled for blasting, or loaded; and

(ii) To any other working places as required by the approved ventilation plan

(2) These devices shall be installed at a distance no greater than 10 feet from the area of deepest penetration to which any portion of the face has been advanced unless an alternative distance is specified and approved in the ventilation plan. Alternative distances specified shall be capable of maintaining concentrations of respirable dust, methane, and other harmful gases below the levels specified in the applicable sections of this chapter.

§ 75.331 Auxiliary fans and tubing.

(a) When auxiliary fans and tubing are used for face ventilation, each auxiliary fan shall be—

(1) Permissible, if the fan is electrically operated;

(2) Maintained in proper operating condition;

(3) Deenergized or shut off when no one is present on the working section; and

(4) Located and operated to avoid recirculation of air.

(b) If a deficiency exists in any auxiliary fan system, the deficiency shall be corrected or the auxiliary fan shall be deenergized immediately.

(c) If the air passing through an auxiliary fan or tubing contains 1.0 percent or more methane, power to electrical equipment in the working place and to the auxiliary fan shall be deenergized, and other mechanized equipment in the working place shall be shut off until the methane concentration is reduced to less than 1.0 percent.

(d) When an auxiliary fan is stopped—(1) Line brattice or other face ventilation control devices shall be used to maintain ventilation to affected faces; and

(2) Electrical equipment in the affected working places shall be disconnected at the power source, and other mechanized equipment shall be shut off until ventilation to the working place is restored.

§ 75.332 Working sections and working places.

(a)(1) Each working section and each area where mechanized mining equipment is being installed or removed, shall be ventilated by a separate split of intake air directed by overcasts, undercasts or other permanent ventilation controls.

(2) When two or more sets of mining equipment are simultaneously engaged in cutting, mining, or loading coal or rock from working places within the same working section, each set of mining equipment shall be on a separate split of intake air.

(3) For purposes of this section, a set of mining equipment includes a single loading machine, a single continuous mining machine, or a single longwall or shortwall mining machine.

(b)(1) Air that has passed through any area that is not examined under §§ 75.360, 75.361 or 75.364 of this subpart, or through an area where second mining has been done shall not be used to ventilate any working place. Second mining is intentional retreat mining where pillars have been wholly or partially removed, regardless of the amount of recovery obtained.

(2) Air that has passed by any opening of any unsealed area that is not examined under §§ 75.360, 75.361 or 75.364 of this subpart, shall not be used to ventilate any working place.

§ 75.333 Ventilation controls.

(a) For purposes of this section; "doors" includes any doorframes, and "durable" describes a material and construction method that when used to construct a ventilation control results in a control that is structurally equivalent to an 8-inch hollow-core concrete block stopping with mortared joints as described in ASTM E72–80 Section 12—Transverse Load-Specimen Vertical, load only.

(b) Permanent stoppings or other permanent ventilation control devices constructed after August 15, 1992, shall be built and maintained—

(1) Between intake and return air courses, except temporary controls may be used in rooms that are 600 feet or less from the centerline of the entry from which the room was developed. Unless otherwise approved in the ventilation plan, these stoppings or controls shall be maintained to and including the third connecting crosscut outby the working face;

(2) To separate belt conveyor haulageways from return air courses, except where belt entries in areas of mines developed before March 30, 1970, are used as return air courses;

(3) To separate belt conveyor haulageways from intake air courses when the air in the intake air course is used to provide air to active working places;

(4) To separate the primary escapeway from belt and trolley haulage entries, as required by § 75.380(g); and

(5) In return air courses to direct air into adjacent worked-out areas.

(c) Personnel doors shall be constructed of noncombustible material and shall be of sufficient strength to serve their intended purpose of maintaining separation and permitting travel between air courses, and shall be installed as follows in permanent stoppings constructed after August 15, 1992:

(1) The distance between personnel doors shall be no more than 300 feet in seam heights below 48 inches and 600 feet in seam heights 48 inches or higher.

(2) The location of all personnel doors in stoppings along escapeways shall be clearly marked so that the doors may be easily identified by anyone traveling in the escapeway and in the entries on either side of the doors.

(3) When not in use, personnel doors shall be closed.

(d) Doors, other than personnel doors, constructed after August 15, 1992, that are used in lieu of permanent stoppings or to control ventilation within an air course shall be:

(1) Made of noncombustible material or coated on all accessible surfaces with flame-retardant material having a flame-spread index of 25 or less, as tested under ASTM E162–87.

(2) Of sufficient strength to serve their intended purpose of maintaining separation and permitting travel between or within air courses or entries.

(3) Installed in pairs to form an airlock. When an airlock is used, one side of the airlock shall remain closed. When not in use, both sides shall be closed.

(e)(1) Except as provided in paragraphs (e)(2) and (e)(3), all overcasts, undercasts, shaft partitions, permanent stoppings, and regulators installed after August 15, 1992, shall be constructed of durable and noncombustible material, such as concrete, concrete block, brick, cinder block, tile, or steel. No ventilation controls installed after August 15, 1992, shall be constructed of aluminum. Controls shall be maintained to serve the purpose for which they were built.

(2) In anthracite mines, permanent stoppings may be constructed of overlapping layers of hardwood mine boards, if the stoppings are a minimum 2 inches thick.

(3) When timbers are used to create permanent stoppings in heaving or caving areas, the stoppings shall be coated on all accessible surfaces with a flame-retardant material having a flame-spread index of 25 or less, as tested under ASTM E162–87, "Surface Flammability of Materials Using a Radiant Heat Energy Source."

(4) In anthracite mines, doors and regulators may be constructed of overlapping layers of hardwood boards, if the doors, door frames, and regulators are a minimum 2 inches thick.

(f) When sealants are applied to ventilation controls, the sealant shall have a flame-spread index of 25 or less under ASTM E162–87.

(g) Before mining is discontinued in an entry or room that is advanced more than 20 feet from the inby rib, a crosscut shall be made or line brattice shall be installed and maintained to provide adequate ventilation. When conditions such as methane liberation warrant a distance less than 20 feet, the approved ventilation plan shall specify the location of such rooms or entries and the maximum distance they will be developed before a crosscut is made or line brattice is installed.

§ 75.334 Worked-out areas and areas where pillars are being recovered.

(a) Worked-out areas where no pillars have been recovered shall be—

(1) Ventilated so that methane-air mixtures and other gases, dusts, and fumes from throughout the worked-out areas are continuously diluted and routed into a return air course or to the surface of the mine; or

(2) Sealed.

(b)(1) During pillar recovery a bleeder system shall be used to control the air passing through the area and to continuously dilute and move methane-air mixtures and other gases, dusts, and fumes from the worked-out area away from active workings and into a return air course or to the surface of the mine.

(2) After pillar recovery a bleeder system shall be maintained to provide ventilation to the worked-out area, or the area shall be sealed.

(c) The approved ventilation plan shall specify the following:

(1) The design and use of bleeder systems;

(2) The means to determine the effectiveness of bleeder systems;

(3) The means for adequately maintaining bleeder entries free of obstructions such as roof falls and standing water; and

(4) The location of ventilating devices such as regulators, stoppings and bleeder connectors used to control air movement through the worked-out area.

(d) If the bleeder system used does not continuously dilute and move methane-air mixtures and other gases, dusts, and fumes away from worked-out areas into a return air course or to the surface of the mine, or it cannot be determined by examinations or evaluations under § 75.364 that the bleeder system is working effectively, the worked-out area shall be sealed.

(e) Each mining system shall be designed so that each worked-out area can be sealed.

(f) In place of the requirements of paragraphs (a) and (b) of this section, for mines with a demonstrated history of spontaneous combustion, or that are

located in a coal seam determined to be susceptible to spontaneous combustion, the approved ventilation plan shall specify the following:

(1) Measures to detect methane, carbon monoxide, and oxygen concentrations during and after pillar recovery, and in worked-out areas where no pillars have been recovered, to determine if the areas must be ventilated or sealed.

(2) Actions that will be taken to protect miners from the hazards of spontaneous combustion.

(3) If a bleeder system will not be used, the methods that will be used to control spontaneous combustion, accumulations of methane-air mixtures, and other gases, dusts, and fumes in the worked-out area.

§ 75.335 Construction of seals.

(a)(1) Each seal constructed after August 15, 1992, shall be—

(i) Constructed of solid concrete blocks at least 6 by 8 by 16 inches, laid in a transverse pattern with mortar between all joints;

(ii) Hitched into solid ribs to a depth of at least 4 inches and hitched at least 4 inches into the floor;

(iii) At least 16 inches thick. When the thickness of the seal is less than 24 inches and the width is greater than 16 feet or the height is greater than 10 feet, a pilaster shall be interlocked near the center of the seal. The pilaster shall be at least 16 inches by 32 inches; and

(iv) Coated on all accessible surfaces with flame-retardant material that will minimize leakage and that has a flame-spread index of 25 or less, as tested under ASTM E162–87, "Surface Flammability of Materials Using a Radiant Heat Energy Source."

(2) Alternative methods or materials may be used to create a seal if they can withstand a static horizontal pressure of 20 pounds per square inch provided the method of installation and the material used is approved in the ventilation plan. If the alternative methods or materials include the use of timbers, the timbers also shall be coated on all accessible surfaces with flame-retardant material having a flame-spread index 25 or less, as tested under ASTM E162–87.

(b) A sampling pipe or pipes shall be installed in each set of seals for a worked-out area. Each pipe shall—

(1) Extend into the sealed area a sufficient distance (at least 15 feet) to obtain a representative sample from behind the seal;

(2) Be equipped with a cap or shut-off valve; and

(3) Be installed with the sampling end of the pipe about 12 inches from the roof.

(c)(1) A corrosion-resistant water pipe or pipes shall be installed in seals at the low points of the area being sealed and at all other locations necessary when water accumulation within the sealed area is possible; and

(2) Each water pipe shall have a water trap installed on the outby side of the seal.

§ 75.340 Underground electrical installations.

(a) Underground transformer stations, battery charging stations, substations, rectifiers, and water pumps shall be located in noncombustible structures or areas or equipped with a fire suppression system meeting the requirements of § 75.1107–3 through § 75.1107–16. This equipment also shall be—

(1) Ventilated by intake air that is coursed into a return air course or to the surface and that is not used to ventilate working places; or

(2) Ventilated with intake air that is monitored for carbon monoxide or smoke by an AMS installed and operated according to § 75.351. Monitoring of intake air ventilating battery charging stations shall be done with sensors not affected by hydrogen; or

(3) Ventilated with intake air and equipped with sensors to monitor for heat and for carbon monoxide or smoke. The sensors shall deenergize power to the installation and activate doors that will automatically close when either of the following occurs:

(i) The temperature in the noncombustible structure reaches 165° F.

(ii) The carbon monoxide concentration reaches 10 parts per million above the ambient level for the area, or the optical density of smoke reaches 0.05 per meter. At least every 31 days, sensors installed to monitor for carbon monoxide shall be calibrated with a known concentration of carbon monoxide and air sufficient to activate the closing door, or each smoke sensor shall be tested to determine that it functions correctly.

(b) This section does not apply to—(1) Rectifiers and power centers with transformers that are either dry-type or contain nonflammable liquid, if they are located at or near the section and are moved as the working section advances or retreats;

(2) Submersible pumps;

(3) Permissible pumps and associated permissible switchgear;

(4) Pumps located on or near the section and that are moved as the working section advances or retreats;

(5) Pumps installed in anthracite mines; and

(6) Small portable pumps.

§ 75.341 Direct-fired intake air heaters.

(a) If any system used to heat intake air malfunctions, the heaters affected shall switch off automatically.

(b) Thermal overload devices shall protect the blower motor from overheating.

(c) The fuel supply shall turn off automatically if a flame-out occurs.

(d) Each heater shall be located or guarded to prevent contact by persons and shall be equipped with a screen at the inlet to prevent combustible materials from passing over the burner units.

(e) If intake air heaters use liquified fuel systems—

(1) Hydrostatic relief valves installed on vaporizers and on storage tanks shall be vented; and

(2) Fuel storage tanks shall be located or protected to prevent fuel from leaking into the mine.

(f) Following any period of 8 hours or more during which a heater does not operate, the heater and its associated components shall be examined within its first hour of operation. Additionally, each heater and its components shall be examined at least once each shift that the heater operates. The examination shall include measurement of the carbon monoxide concentration at the bottom of each shaft, slope, or in the drift opening where air is being heated. The measurements shall be taken by a person designated by the operator or by a carbon monoxide sensor that is calibrated with a known concentration of carbon monoxide and air at least once every 31 days. When the carbon monoxide concentration at this location reaches 50 parts per million, the heater causing the elevated carbon monoxide level shall be shut down.

§ 75.342 Methane monitors.

(a)(1) MSHA approved methane monitors shall be installed on all face cutting machines, continuous miners, longwall face equipment, loading machines, and other mechanized equipment used to extract or load coal within the working place.

(2) The sensing device for methane monitors on longwall shearing machines shall be installed at the return air end of the longwall face. An additional sensing device also shall be installed on the longwall shearing machine, downwind and as close to the cutting head as practicable. An alternative location or locations for the sensing device required

on the longwall shearing machine may be approved in the ventilation plan.

(3) The sensing devices of methane monitors shall be installed as close to the working face as practicable.

(4) Methane monitors shall be maintained in permissible and proper operating condition and calibrated with a known methane-air mixture at least once every 31 days.

(b)(1) When the methane concentration at any methane monitor reaches 1.0 percent the monitor shall give a warning signal.

(2) The warning signal device of the methane monitor shall be visible to a person who can deenergize the equipment on which the monitor is mounted.

(c) The methane monitor shall automatically deenergize the machine on which it is mounted when—

(1) The methane concentration at any methane monitor reaches 2.0 percent; or

(2) The monitor is not operating properly.

§ 75.343 Underground shops.

(a) Underground shops shall be equipped with an automatic fire suppression system meeting the requirements of § 75.1107–3 through § 75.1107–16, or be enclosed in a noncombustible structure or area.

(b) Underground shops shall be ventilated with intake air that is coursed directly into a return air course.

§ 75.344 Compressors.

(a) Except compressors that are components of equipment such as locomotives and rock dusting machines and compressors of less than five horsepower, electrical compressors shall be—

(1) Located in a noncombustible structure or area; and

(2) Equipped with a heat activated fire suppression system meeting the requirements of § 75.1107–3 through § 75.1107–16.

(b) These compressors shall be operated only—

(1) While they can be seen by a person designated by the operator; or

(2) While they are ventilated by intake air coursed directly into a return air course or to the surface and equipped with sensors to monitor for heat and for carbon monoxide or smoke. The sensors shall activate doors to enclose the noncombustible structure or area when either of the following occur:

(i) The temperature in the noncombustible structure or area reaches 165° F.

(ii) The carbon monoxide concentration reaches 10 parts per million above the ambient level for the area, or the optical density of smoke reaches 0.05 per meter. At least once every 31 days, sensors installed to monitor for carbon monoxide shall be calibrated with a known concentration of carbon monoxide and air sufficient to activate the closing door, and each smoke sensor shall be tested to determine that it functions correctly.

(c) Two portable fire extinguishers or one extinguisher having at least twice the minimum capacity specified for a portable fire extinguisher in § 75.1100–1(e) shall be provided for each compressor.

(d) In addition to electrical compressors, this section shall apply to diesel compressors.

§ 75.350 Air courses and belt haulage entries.

In any coal mine opened after March 30, 1970, the entries used as intake and return air courses shall be separated from belt haulage entries, and each operator of such mine shall limit the velocity of the air coursed through belt haulage entries to the amount necessary to provide an adequate supply of oxygen in such entries, and to insure that the air therein shall contain less than 1.0 volume per centum of methane, and such air shall not be used to ventilate active working places. Whenever an authorized representative of the Secretary finds, in the case of any coal mine opened on or prior to March 30, 1970, that has been developed with more than two entries, that the conditions in the entries, other than belt haulage entries, are such as to permit adequately the coursing of intake or return air through such entries:

(a) The belt haulage entries shall not be used to ventilate, unless such entries are necessary to ventilate, active working places, and

(b) when the belt haulage entries are not necessary to ventilate the active working places, the operator of such mine shall limit the velocity of the air coursed through the belt haulage entries to the amount necessary to provide an adequate supply of oxygen in such entries, and to ensure that air therein shall contain less than 1.0 volume per centum of methane.

§ 75.351 Atmospheric monitoring system (AMS).

(a) *Minimum requirements.* An AMS shall consist of sensors to monitor the mine atmosphere and instruments at a surface location designated by the operator to receive information from the monitoring sensors. Each AMS installed in accordance with §§ 75.323(d)(1)(ii), 75.340(a)(2) and 75.362(f) shall do the following:

(1) Monitor for circuit continuity and sensor function, and identify at the designated surface location any activated or malfunctioning sensor.

(2) Signal a designated surface location at the mine when any interruption of circuit continuity occurs or any sensor malfunctions.

(3) Signal affected working sections and the designated surface location when—

(i) The carbon monoxide concentration at any carbon monoxide sensor reaches 5 parts per million above the established ambient level for that area; or

(ii) The methane concentration at any methane monitoring station exceeds the maximum allowable concentration as specified for that location in § 75.323.

(4) Activate alarms at a designated surface location and affected working sections when the carbon monoxide concentration at any carbon monoxide sensor reaches 10 parts per million above the established ambient level for the area or when the optical density of smoke at any smoke sensor reaches 0.05 per meter.

(b) *Return splits.* (1) If used to monitor return air splits under § 75.362(f), AMS sensors shall monitor the mine atmosphere for percentage of methane in each return split of air from each working section between the last working place, or longwall or shortwall face, ventilated by that air split and the junction of that return air split with another air split, seal, or worked-out area. If auxiliary fans and tubing are used, the sensor also shall be located outby the auxiliary fan discharge.

(2) If used to monitor air splits under § 75.323(d)(1)(ii), AMS sensors shall monitor the mine atmosphere at the following locations:

(i) In the return air course opposite the section loading point or, if auxiliary fans and tubing are used, in the return air course outby the auxiliary fans and a point opposite the section loading point.

(ii) Immediately inby the location where the split of air meets another split of air, or inby the location where the split of air is used to ventilate seals or worked-out areas.

(c) *Electrical installations.* If used to monitor the intake air ventilating underground transformer stations, battery charging stations, substations, rectifiers, or water pumps under § 75.340(a)(2), at least one sensor shall be installed to monitor the mine atmosphere for carbon monoxide or smoke at least 50 feet and no more than 100 feet downstream in the direction of air flow.

(d) *Signals and alarms.* (1) A person designated by the operator shall be at a surface location where the signals and alarms from the AMS can always be seen or heard while anyone is underground. This person shall have access to two-way communication with working sections and with other identifiable duty stations underground. A mine map showing the underground monitoring system shall be posted at the surface location.

(2) If a signal from any AMS sensor is activated, the monitor producing the signal shall be identified, an examination shall be made to determine the cause of the activation, and appropriate action shall be taken.

(e) *Sensors.* (1) Each carbon monoxide sensor shall be capable of detecting carbon monoxide in air at a level of ±1 part per million throughout the operating range.

(2) Each methane sensor shall be capable of detecting 1.0 percent methane in air with an accuracy of ±0.2 percent methane.

(3) Each smoke sensor shall be capable of detecting the optical density of smoke with an accuracy of ±0.005 per meter.

(f) *Testing and calibration.* At least once every 31 days—

(1) Each carbon monoxide sensor shall be calibrated with a known concentration of carbon monoxide and air sufficient to activate an alarm;

(2) Each smoke sensor shall be functionally tested;

(3) Each methane sensor shall be calibrated with a known methane-air mixture; and

(4) Each oxygen sensor shall be calibrated with air having a known oxygen concentration.

(g) *Intrinsic Safety.* Components of AMS installed in areas where permissible equipment is required shall be intrinsically safe.

(h) *Recordkeeping.* If a signal device or alarm is activated, a record shall be made of the date, time, type of sensor, and the reason for its activation. Also the maximum concentration detected at the sensor producing the signal shall be recorded.

(i) *Retention period.* Records shall be retained for at least 1 year at a surface location at the mine and made available for inspection by authorized representatives of the Secretary and representatives of miners.

§ 75.352 Return air courses.

Entries used as return air courses shall be separated from belt haulage entries by permanent ventilation controls.

§ 75.360 Preshift examination.

(a) Within 3 hours preceding the beginning of any shift and before anyone on the oncoming shift, other than certified persons conducting examinations required by this subpart, enters any underground area of the mine, a certified person designated by the operator shall make a preshift examination.

(b) The person conducting the preshift examination shall examine for hazardous conditions, test for methane and oxygen deficiency, and determine if the air is moving in its proper direction, at the following locations:

(1) Roadways, track haulageways, and other areas where persons are scheduled to work or travel during the oncoming shift.

(2) Belt conveyors that will be used to transport persons during the oncoming shift and the entries in which these belt conveyors are located.

(3) Working sections and areas where mechanized mining equipment is being installed or removed, if anyone is scheduled to work on the section or in the area during the oncoming shift. This includes working places, approaches to worked-out areas and ventilation controls on these sections or in these areas.

(4) Approaches to worked-out areas along intake air courses if intake air passes by the worked-out area to ventilate working sections where anyone is scheduled to work during the oncoming shift.

(5) Seals along intake air courses where intake air passes by a seal to ventilate working sections where anyone is scheduled to work during the oncoming shift.

(6) Entries and rooms driven more than 20 feet off an intake air course without a crosscut or more than 2 crosscuts off an intake air course without permanent ventilation controls where intake air passes through or by these entries or rooms to a working section where anyone is scheduled to work during the oncoming shift.

(7) Where unattended diesel equipment is to operate or areas where trolley wires or trolley feeder wires are to be or will remain energized during the oncoming shift.

(c) The person conducting the preshift examination shall determine the volume of air entering each of the following areas if anyone is scheduled to work in the areas during the oncoming shift:

(1) In the last open crosscut of each set of entries or rooms on each working section and areas where mechanized mining equipment is being installed or removed. The last open crosscut is the crosscut in the line of pillars containing the permanent stoppings that separate the intake air courses and the return air courses.

(2) On each longwall or shortwall in the intake entry or entries at the intake end of the longwall or shortwall face immediately outby the face and the velocity of air at each end of the face at the locations specified in the approved ventilation plan.

(3) At the intake end of any pillar line—(i) If a single split of air is used, in the intake entry furthest from the return air course, immediately outby the first open crosscut outby the line of pillars being mined; or

(ii) If a split system is used, in the intake entries of each split immediately inby the split point.

(d) The district manager may require the certified person to examine other areas of the mine or examine for other hazards during the preshift examination.

(e) Any area of the mine where hazardous conditions are found shall be posted with a conspicuous danger sign where anyone entering the area would pass. Only persons designated by the operator to correct or evaluate the condition may enter this posted area.

(f) *Certification.* At each working place examined, the person doing the preshift examination shall certify by initials, date, and the time, that the examination was made. In areas required to be examined outby a working section, the certified person shall certify by initials, date, and the time at enough locations to show that the entire area has been examined.

(g) *Recordkeeping.* A record of hazardous conditions and their locations found by the examiner during each examination and of the results and locations of air and methane measurements shall be made in a book provided for that purpose on the surface before any persons other than certified persons conducting examinations required by this subpart enter any underground area of the mine. The record shall be made by the certified person who made the examination or by a person designated by the operator and shall be countersigned by the mine foreman. If the record is made by someone other than the examiner, the examiner shall verify the record by initials and date by the end of the shift for which the examination was made.

(h) *Retention period.* Records shall be retained for at least 1 year at a surface location at the mine and made available for inspection by authorized representatives of the Secretary and representatives of miners.

§ 75.361 Supplemental examination.

(a) Except for certified persons conducting examinations required by this subpart, within 3 hours before anyone enters an area in which a preshift examination has not been made for that shift, a certified person shall examine the area for hazardous conditions, determine whether the air is traveling in its proper direction and at its normal volume, and test for methane and oxygen deficiency.

(b) Certification. At each working place examined, the person making the supplemental examination shall certify by initials, date, and the time, that the examination was made. In areas required to be examined outby a working section, the certified person shall certify by initials, date, and the time at enough locations to show that the entire area has been examined.

§ 75.362 On-shift examination.

(a)(1) During each shift, a certified person designated by the operator shall examine each section where coal is produced and any area where mechanized mining equipment is being installed or removed during the shift. The certified person shall check for hazardous conditions, test for methane and oxygen deficiency, and determine if the air is moving in its proper direction.

(2) Hazardous conditions shall be corrected immediately. If these conditions create an imminent danger, everyone except those persons referred to in section 104(c) of the Act shall be withdrawn from the area affected to a safe area until the hazardous condition is corrected.

(b) During each shift that coal is produced, a certified person shall examine for hazardous conditions along each belt conveyor haulageway where a belt conveyor is operated. This examination may be conducted at the same time as the preshift examination of belt conveyors and belt conveyor haulageways, if the examination is conducted within 3 hours before the oncoming shift.

(c) Persons conducting the on-shift examination shall determine at the following locations:

(1) The volume of air in the last open crosscut of each set of entries or rooms on each working section and areas where mechanized mining equipment is being installed or removed. The last open crosscut is the crosscut in the line of pillars containing the permanent stoppings that separate the intake air courses and the return air courses.

(2) The volume of air on a longwall or shortwall, including areas where longwall or shortwall equipment is being installed or removed, in the intake entry or entries at the intake end of the longwall or shortwall.

(3) The velocity of air at each end of the longwall or shortwall face at the locations specified in the approved ventilation plan.

(4) The volume of air at the intake end of any pillar line—

(i) Where a single split of air is used in the intake entry furthest from the return air course immediately outby the first open crosscut outby the line of pillars being mined; or

(ii) Where a split system is used in the intake entries of each split immediately inby the split point.

(d)(1) A qualified person shall make tests for methane—

(i) Immediately before equipment is energized, taken into, or operated in a working place; and

(ii) At 20-minute intervals during the operation of equipment in the working place.

(2) These tests shall be made in working places at the last permanent roof supports, unless tests are required in the approved ventilation plan to be made closer to the working face using extendable probes or other acceptable means. When longwall or shortwall mining systems are used, tests shall be made at the location of the shearer, the plow, or the cutting head, as applicable, at 20-minute intervals. Also, when mining has been stopped for more than 20 minutes, tests shall be conducted at the location of the shearer, plow, or cutting head before startup.

(e) If auxiliary fans and tubing are used, they shall be inspected frequently.

(f) During each shift that coal is produced and at intervals not exceeding 4 hours, tests for methane shall be made by a certified person or by an atmospheric monitoring system (AMS) in each return split of air from each working section between the last working place, or longwall or shortwall face, ventilated by that split of air and the junction of the return air split with another air split, seal, or worked-out area. If auxiliary fans and tubing are used, the tests shall be made at a location outby the auxiliary fan discharge.

(g) Recordkeeping. At or by the completion of each shift during which examinations required by this section are conducted, a record of hazardous conditions found or reported to the certified person and their locations shall be made in a book kept on the surface for that purpose. The record shall be made by the person doing the examinations or a person designated by the operator. If made by a person other than the examiner, the examiner shall verify the record by initials and date. The record also shall include the corrective action taken and shall be countersigned by the mine foreman.

(h) Retention period. Records shall be retained for at least 1 year at a surface location at the mine and made available for inspection by authorized representatives of the Secretary and representatives of miners.

§ 75.364 Weekly examination.

(a) *Worked-out areas.* (1) At least every 7 days, a certified person shall examine unsealed worked-out areas where no pillars have been recovered by traveling to the area of deepest penetration, measuring methane and oxygen concentrations and making tests to determine if the air is moving in its proper direction in the area. An alternative method of evaluating the ventilation of the area may be approved in the ventilation plan.

(2) At least every 7 days, a certified person shall evaluate the effectiveness of bleeder systems used under § 75.334 (b) and (c) as follows:

(i) Measurements of methane and oxygen concentrations and a test to determine if the air is moving in its proper direction shall be made where air enters the worked-out area.

(ii) Measurements of methane and oxygen concentrations and a test to determine if the air is moving in its proper direction shall be made immediately before the air enters a return split of air.

(iii) At least once each week, bleeder entries used as part of a bleeder system under § 75.334, shall be traveled in their entirety, or to locations approved in the ventilation plan where measurements of methane and oxygen concentrations and a test to determine if the air is moving in its proper direction can be made.

(b) *Hazardous conditions.* At least every 7 days, an examination for hazardous conditions at the following locations shall be made by a certified person designated by the operator:

(1) In at least one entry of each intake air course, in its entirety, so that the entire air course is traveled.

(2) In at least one entry of each return air course, in its entirety, so that the entire air course is traveled.

(3) In each longwall or shortwall travelway in its entirety, so that the entire travelway is traveled.

(4) At each seal along return and bleeder air courses and at each seal along intake air courses not examined under § 75.360(b)(5).

(5) In each escapeway so that the entire escapeway is traveled.

(6) On each working section not examined under § 75.360(b)(3) during the previous 7 days.

(c) *Measurements and tests.* At least every 7 days, a certified person shall—

(1) Determine the volume of air entering the main intakes and in each intake split;

(2) Determine the volume of air and test for methane in the last open crosscut in any pair or set of developing entries or rooms, in the return of each split of air immediately before it enters the main returns, and where the air leaves the main returns; and

(3) Test for methane in the return entry nearest each set of seals immediately after the air passes the seals.

(d) Hazardous conditions shall be corrected immediately. If the condition creates an imminent danger, everyone except those persons referred to in section 104(c) of the Act shall be withdrawn from the area affected to a safe area until the hazardous condition is corrected.

(e) The weekly examination may be conducted at the same time as the preshift or on-shift examinations.

(f)(1) The weekly examination is not required during any 7 day period in which no one enters any underground area of the mine.

(2) Except for certified persons required to make examinations, no one shall enter any underground area of the mine if a weekly examination has not been completed within the previous 7 days.

(g) *Certification.* The person making the weekly examinations shall certify by initials, date, and the time that the examination was made. Certifications and times shall appear at enough locations to show that the entire area has been examined.

(h) *Recordkeeping.* At the completion of any shift during which a portion of a weekly examination is made, a record of hazardous conditions, their locations, and the corrective action taken, and the results and location of air and methane measurements shall be made. The record shall be made by the person making the examination or a person designated by the operator and shall be countersigned by the mine foreman. If made by a person other than the examiner, the examiner shall verify the record by initials and date.

(i) *Retention period.* Records shall be retained for at least 1 year at a surface location at the mine and made available for inspection by authorized representatives of the Secretary and representatives of miners.

§ 75.370 Mine ventilation plan; submission and approval.

(a)(1) The operator shall develop and follow a ventilation plan approved by the district manager. The plan shall be designed to control methane and respirable dust and shall be suitable to the conditions and mining system at the mine. The ventilation plan shall consist of two parts, the plan content as prescribed in § 75.371 and the ventilation map with information as prescribed in § 75.372. Only that portion of the map which contains information required under § 75.371 will be subject to approval by the district manager.

(2) The proposed ventilation plan and any revision to the plan shall be submitted in writing to the district manager. When revisions to a ventilation plan are proposed, only the revised pages, maps, or sketches of the plan need to be submitted. When required in writing by the district manager, the operator shall submit a fully revised plan by consolidating the plan and all revisions in an orderly manner and by deleting all outdated material.

(3) A copy of the proposed ventilation plan, and any revision to the plan, submitted for approval shall be made available for inspection by the representative of miners and posted on the mine bulletin board.

(b)(1) The district manager will notify the operator in writing of the approval or denial of approval of a proposed ventilation plan or proposed revision.

(2) If the district manager denies approval of a proposed plan or revision, the deficiencies of the plan or revision shall be specified in writing and the operator will be provided an opportunity to discuss the deficiencies with the district manager.

(c) No proposed ventilation plan shall be implemented before it is approved by the district manager. Any intentional change to the ventilation system that alters the main air current or any split of the main air current in a manner that could materially affect the safety and health of the miners, or any change to the information required in § 75.371 shall be submitted to and approved by the district manager before implementation.

(d) Before implementing an approved ventilation plan or a revision to a ventilation plan, persons affected by the revision shall be instructed by the operator in its provisions.

(e) The approved ventilation plan and any revisions shall be available for inspection by the representatives of miners, and it shall be posted on the mine bulletin board.

(f) The ventilation plan for each mine shall be reviewed every 6 months by an authorized representative of the Secretary to assure that it is suitable to current conditions in the mine.

(g) Existing ventilation plans that conflict with this subpart D shall be revised to meet the requirements of this subpart D before February 15, 1993. This paragraph (g) shall expire August 16, 1993.

§ 75.371 Mine ventilation plan; contents.

The mine ventilation plan shall contain the information described below and any additional provisions required by the district manager:

(a) The mine name, company name, mine identification number, and the name of the individual submitting the plan information.

(b) Planned main mine fan stoppages, other than those scheduled for testing, maintenance or adjustment, including procedures to be followed during these stoppages and subsequent restarts (see § 75.311(a)) and the type of device to be used for monitoring main mine fan pressure, if other than a pressure recording device (see 75.310(a)(4)).

(c) Methods of protecting main mine fans and associated components from the forces of an underground explosion if a 15-foot offset from the nearest side of the mine opening is not provided (see § 75.310(a)(6)); and the methods of protecting main mine fans and intake air openings if combustible material will be within 100 feet of the area surrounding the fan or these openings (see § 75.311(f)).

(d) Persons that will be permitted to enter the mine, the work these persons will do while in the mine, and electric power circuits that will be energized when a back-up fan system is used that does not provide the ventilating quantity provided by the main mine fan (see § 75.311(c)).

(e) The locations and operating conditions of booster fans installed in anthracite mines (see § 75.302).

(f) Section and face ventilation systems used, including drawings illustrating how each system is used, and a description of each different dust suppression system used on equipment on working sections.

(g) Locations where the air quantities must be greater than 3,000 cubic feet per minute (see § 75.325(a)(1)).

(h) In anthracite mines, locations where the air quantities must be greater than 1,500 cubic feet per minute (see § 75.325(e)(1)).

(i) Working places and working faces other than those where coal is being cut, mined, drilled for blasting or loaded, where a minimum air quantity will be

maintained, and the air quantity at those locations (see § 75.325(a)(1)).

(j) The operating volume of machine mounted dust collectors or diffuser fans, if used (see § 75.325(a)(3)).

(k) The minimum mean entry air velocity in exhausting face ventilation systems where coal is being cut, mined, drilled for blasting, or loaded, if the velocity will be less than 60 feet per minute. Other working places where coal is not being cut, mined, drilled for blasting or loaded, where at least 60 feet per minute or some other minimum mean entry air velocity will be maintained (see § 75.326).

(l) The maximum distance if greater than 10 feet from each working face at which face ventilation control devices will be installed (see § 75.330(b)(2)). The working places other than those where coal is being cut, mined, drilled for blasting or loaded, where face ventilation control devices will be used (see § 75.330(b)(1)(ii).

(m) The volume of air required in the last open crosscut or the quantity of air reaching the pillar line if greater than 9,000 cubic feet per minute (see § 75.325(b)).

(n) In anthracite mines, the volume of air required in the last open crosscut or the quantity of air reaching the pillar line if greater than 5,000 cubic feet per minute (see § 75.325(e)(2)).

(o) Locations where separations of intake and return air courses will be built and maintained to other than the third connecting crosscut outby each working face (see § 75.333(b)(1)).

(p) The volume of air required at the intake to the longwall sections, if different than 30,000 cubic feet per minute (see § 75.325(c)).

(q) The velocities of air on a longwall or shortwall face, and the locations where the velocities must be measured (see § 75.325(c)(2)).

(r) The quantity of air and ventilation controls that will be provided during the installation and removal of mechanized mining equipment (see § 75.325(d)).

(s) The locations where the methane tests required by § 75.362(d) will be made closer to the working face than at the location of the last permanent roof supports using extendable probes or other acceptable means (see § 75.362(d)(2)).

(t) The locations where samples for "designated areas" will be collected, including the specific location of each sampling device, and the respirable dust control measures used at the dust generating sources for these locations (see § 70.208 of this chapter).

(u) The methane and dust control systems at underground dumps, crushers, transfer points, and haulageways.

(v) Areas in trolley haulage entries where the air velocity will be greater than 250 feet per minute and the velocity in these areas (see § 75.327(b)).

(w) Locations where entries will be advanced less than 20 feet from the inby rib without a crosscut being provided where a line brattice will be required. (see § 75.333(g)).

(x) A description of the bleeder system to be used, including its design (see § 75.334).

(y) The means for determining the effectiveness of bleeder systems (see § 75.334(c)(2)).

(z) The location of evaluation points where measurements of methane and oxygen concentrations and tests to determine whether the air is moving in the proper direction will be made to evaluate nonpillared worked-out areas (see § 75.364(a)(1) and bleeder systems (see § 75.364(a)(2)(iii)).

(aa) The means for adequately maintaining bleeder entries free of obstructions such as roof falls and standing water (see § 75.334(c)(3)).

(bb) The location of ventilating devices such as regulators, stoppings and bleeder connectors used to control air movement through worked-out areas (see § 75.334(c)(4)).

(cc) In mines with a demonstrated history of spontaneous combustion: a description of the measures that will be used to detect methane, carbon monoxide, and oxygen concentration during and after pillar recovery and in worked-out areas where no pillars have been recovered (see § 75.334(f)(1); and, the actions which will be taken to protect miners from the hazards associated with spontaneous combustion (see § 75.334(f)(2). If a bleeder system will not be used, the methods that will be used to control spontaneous combustion, accumulations of methane-air mixtures, and other gases, dusts, and fumes in the worked-out area (see § 75.334(f)(3)).

(dd) The location of all horizontal degasification holes that are longer than 1,000 feet and the location of all vertical degasification holes.

(ee) If methane drainage systems are used, a detailed sketch of each system, including a description of safety precautions used with the systems.

(ff) A description of the methods and materials to be used to seal worked-out areas if those methods or materials will be different from those specified by § 75.335(a)(1).

(gg) The alternative location for the additional sensing device if the device will not be installed on the longwall shearing machine (see § 75.342(a)(2)).

(hh) The ambient level in parts per million of carbon monoxide, and the method for determining the ambient level, in all areas where carbon monoxide sensors are installed.

(ii) The distance that separation between the primary escapeway and the belt or track haulage entries will be maintained if other than to the first connecting crosscut outby the section loading point (see § 75.380(g)).

(jj) In anthracite mines, the dimensions of escapeways where the pitch of the coal seam does not permit escapeways to be maintained 4 feet by 5 feet and the locations where these dimensions must be maintained (see § 75.381(c)(4)).

§ 75.372 Mine ventilation map.

(a)(1) At intervals not exceeding 12 months, the operator shall submit to the district manager 3 copies of an up-to-date map of the mine drawn to a scale of not less than 100 nor more than 500 feet to the inch. A registered engineer or a registered surveyor shall certify that the map is accurate.

(2) In addition to the informational requirements of this section the map may also be used to depict and explain plan contents that are required in § 75.371. Information shown on the map to satisfy the requirements of § 75.371 shall be subject to approval by the district manager.

(b) The map shall contain the following information:

(1) The mine name, company name, mine identification number, a legend identifying the scale of the map and symbols used, and the name of the individual responsible for the information on the map.

(2) All areas of the mine, including sealed and unsealed worked-out areas.

(3) All known mine workings on mine property that are located in the same coalbed within 1,000 feet of existing or projected workings. These workings may be shown on a mine map with a scale other than that required by paragraph (a) of this section, if the scale does not exceed 2,000 feet to the inch and is specified on the map.

(4) The locations of all known mine workings underlying and overlying the mine property and the distance between the mine workings.

(5) The locations of all known oil and gas wells and all known drill holes that penetrate the coalbed being mined.

(6) The locations of all main mine fans, installed backup fans and motors, and each fan's specifications, including size, type, model number, manufacturer, operating pressure, motor horsepower, and revolutions per minute.

(7) The locations of all surface mine openings and the direction and quantity of air at each opening.

(8) The elevation at the top and bottom of each shaft and slope, and shaft and slope dimensions, including depth and length.

(9) The direction of air flow in all underground areas of the mine.

(10) The locations of all active working sections and the four-digit identification number for each mechanized mining unit (MMU).

(11) The location of all escapeways.

(12) The locations of all ventilation controls, including permanent stoppings, overcasts, undercasts, regulators, seals, airlock doors, haulageway doors and other doors, except temporary ventilation controls on working sections.

(13) The direction and quantity of air—(i) Entering and leaving each split;

(ii) In the last open crosscut of each set of entries and rooms; and

(iii) At the intake end of each pillar line, including any longwall or shortwall.

(14) Projections for at least 12 months of anticipated mine development, proposed ventilation controls, proposed bleeder systems, and the anticipated location of intake and return air courses, belt entries, and escapeways.

(15) The locations of existing methane drainage systems.

(16) The locations of all atmospheric monitoring system sensors.

(17) Contour lines that pass through whole number elevations of the coalbed being mined. These lines shall be spaced at 10-foot elevation levels unless a wider spacing is permitted by the district manager.

(18) The location of proposed seals for each worked-out area.

(c) The mine map required by § 75.1200 may be used to satisfy the requirements for the ventilation map, provided that all the information required by this section is contained on the map.

§ 75.373 Reopening mines.

After a mine is abandoned or declared inactive, and before it is reopened, mining operations shall not begin until MSHA has been notified and has completed an inspection.

§ 75.380 Escapeways; bituminous and lignite mines.

(a) Except in situations addressed in § 75.381, § 75.385 and § 75.386, at least two separate and distinct travelable passageways shall be designated as escapeways and shall meet the requirements of this section.

(b)(1) Escapeways shall be provided from each working section, and each area where mechanized mining equipment is being installed or removed, continuous to the surface escape drift opening or continuous to the escape shaft or slope facilities to the surface.

(2) During equipment installation, these escapeways shall begin at the projected location for the section loading point. During equipment removal, they shall begin at the location of the last loading point.

(c) The two separate and distinct escapeways required by this section shall not end at a common shaft, slope, or drift opening, except that multiple compartment shafts or slopes separated by walls constructed of noncombustible material may be used as separate and distinct passageways.

(d) Each escapeway shall be—(1) Maintained in a safe condition to always ensure passage of anyone, including disabled persons;

(2) Clearly marked to show the route and direction of travel to the surface;

(3) Maintained to at least a height of 5 feet from the mine floor to the mine roof, excluding the thickness of any roof support, except that the escapeways shall be maintained to at least the height of the coalbed excluding the thickness of any roof support where the coalbed is less than 5 feet;

(4) Maintained at least 6 feet wide except—(i) Where necessary supplemental roof support is installed, the escapeway shall be not less than 4 feet wide; or

(ii) Where the route of travel passes through doors or other permanent ventilation controls, the escapeway shall be at least 4 feet wide to enable miners to escape quickly in an emergency;

(5) Located to follow the most direct, safe and practical route to the surface; and

(6) Provided with ladders, stairways, ramps, or similar facilities where the escapeways cross over obstructions.

(e) Surface openings shall be adequately protected to prevent surface fires, fumes, smoke, and flood water from entering the mine.

(f)(1) Primary escapeway. One escapeway that is ventilated with intake air shall be designated as the primary escapeway. In areas of mines developed after September 15, 1992, the primary escapeway shall not contain diesel equipment, electrical equipment described in § 75.340(a) and § 75.340(b)(1), or compressors described in § 75.344, except—

(i) Equipment necessary to maintain the escapeway in safe, travelable condition; and

(ii) Haulage equipment, other than belt and trolley haulage, necessary for the transportation of persons and materials.

(2) Mobile equipment used in the primary escapeway under paragraphs (f)(1)(i) and (f)(1)(ii) of this section shall be equipped with a multipurpose dry powder type fire suppression system suitable for the intended application and listed or approved by a nationally recognized independent testing laboratory. This fire suppression system shall be capable of both automatic and manual activation.

(g) Except where separation of belt and trolley haulage entries from designated escapeways did not exist before September 15, 1992, the primary escapeway shall be separated from belt and trolley haulage entries for its entire length, to and including the first connecting crosscut outby each loading point except when a greater or lesser distance for this separation is specified and approved in the ventilation plan and does not pose a hazard to miners.

(h) Alternate escapeway. One escapeway shall be designated as the alternate escapeway. The alternate escapeway shall be separated from the primary escapeway for its entire length, except that the alternate and primary escapeways may be ventilated from a common intake air shaft or slope opening.

(i) Mechanical escape facilities shall be provided and maintained for—

(1) Each shaft that is part of a designated escapeway and is greater than 50 feet in depth; and

(2) Each slope that is part of a designated escapeway that is either inclined 18 degrees or more from the horizontal or is inclined 9 degrees or more from the horizontal and is greater than 1,000 feet in length.

(j) Within 30 minutes after mine personnel on the surface have been notified of an emergency requiring evacuation, mechanical escape facilities provided under paragraph (i) of this section shall be operational at the bottom of shaft and slope openings that are part of escapeways.

(k) Except where automatically activated hoisting equipment is used, the bottom of each shaft or slope opening that is part of a designated escapeway shall be equipped with a means of signalling a surface location where a person is always on duty when anyone is underground. When the signal is activated or the evacuation of persons underground is necessary, the person shall ensure that mechanical escape facilities are operational as required by paragraph (j) of this section.

(l)(1) Stairways or mechanical escape facilities shall be installed in shafts that

are part of the designated escapeways and that are 50 feet or less in depth, except ladders may be used in shafts that are part of the designated escapeways and that are 5 feet or less in depth.

(2) Stairways shall be constructed of concrete or metal, set on an angle not to exceed 45 degrees from the horizontal, and equipped on the open side with handrails. In addition, landing platforms that are at least 2 feet by 4 feet shall be installed at intervals not to exceed 20 vertical feet on the stairways and equipped on the open side with handrails.

(3) Ladders shall be constructed of metal, anchored securely, and set on an angle not to exceed 60 degrees from the horizontal.

(m) A travelway designed to prevent slippage shall be provided in slope and drift openings that are part of designated escapeways, unless mechanical escape facilities are installed.

§ 75.381 Escapeways; anthracite mines.

(a) Except as provided in §§ 75.385 and 75.386, at least two separate and distinct travelable passageways shall be designated as escapeways and shall meet the requirements of this section.

(b) Escapeways shall be provided from each working section continuous to the surface.

(c) Each escapeway shall be—(1) Maintained in a safe condition to always ensure passage of anyone, including disabled persons;

(2) Clearly marked to show the route of travel to the surface;

(3) Provided with ladders, stairways, ramps, or similar facilities where the escapeways cross over obstructions; and

(4) Maintained at least 4 feet wide by 5 feet high. If the pitch or thickness of the coal seam does not permit these dimensions to be maintained other dimensions may be approved in the ventilation plan.

(d) Surface openings shall be adequately protected to prevent surface fires, fumes, smoke, and flood water from entering the mine.

(e) Primary escapeway. One escapeway that shall be ventilated with intake air shall be designated as the primary escapeway.

(f) Alternate escapeway. One escapeway that shall be designated as the alternate escapeway shall be separated from the primary escapeway for its entire length.

(g) Mechanical escape facilities shall be provided—

(1) For each shaft or slope opening that is part of a primary escapeway; and

(2) For slopes that are part of escapeways, unless ladders are installed.

(h) Within 30 minutes after mine personnel on the surface have been notified of an emergency requiring evacuation, mechanical escape facilities shall be operational at the bottom of each shaft and slope opening that is part of an escapeway.

(i) Except where automatically activated hoisting equipment is used, the bottom of each shaft or slope opening that is part of a primary escapeway shall be equipped with a means of signalling a surface location where a person is always on duty when anyone is underground. When the signal is activated or the evacuation of personnel is necessary, the person on duty shall ensure that mechanical escape facilities are operational as required by paragraph (h) of this section.

§ 75.382 Mechanical escape facilities.

(a) Mechanical escape facilities shall be provided with overspeed, overwind, and automatic stop controls.

(b) Every mechanical escape facility with a platform, cage, or other device shall be equipped with brakes that can stop the fully loaded platform, cage, or other device.

(c) Mechanical escape facilities, including automatic elevators, shall be examined weekly. The weekly examination of this equipment may be conducted at the same time as a daily examination required by § 75.1400–3.

(1) The weekly examination shall include an examination of the headgear, connections, links and chains, overspeed and overwind controls, automatic stop controls, and other facilities.

(2) At least once each week, the hoist shall be run through one complete cycle of operation to determine that it is operating properly.

(d) A person trained to operate the mechanical escape facility always shall be available while anyone is underground to provide the mechanical escape facilities, if required, to the bottom of each shaft and slope opening that is part of an escapeway within 30 minutes after personnel on the surface have been notified of an emergency requiring evacuation. However, no operator is required for automatically operated cages, platforms, or elevators.

(e) Mechanical escape facilities shall have rated capacities consistent with the loads handled.

(f) Manually-operated mechanical escape facilities shall be equipped with indicators that accurately and reliably show the position of the facility.

§ 75.383 Escapeway maps and drills.

(a) A map shall be posted in each working section, and in each area where mechanized mining equipment is being installed or removed, and shall show the designated escapeways from the working section to the location where miners must travel to satisfy the escapeway drill specified in paragraph (b)(1) of this section. A map showing the main escapeways shall be posted at a surface location of the mine where miners congregate, such as at the mine bulletin board, bathhouse, or waiting room. All maps shall be kept up to date, and any changes in route of travel, locations of any doors, or directions of airflow shall be shown on the maps by the end of the shift on which the changes are made, and affected miners shall be informed of the changes before entering the underground areas of the mine.

(b)(1) At least once every 90 days, each miner, including miners with working stations located between working sections and main escapeways, shall participate in a practice escapeway drill. During this drill, each miner shall travel the primary or alternate escapeway from the miner's working section or area where mechanized mining equipment is being installed or removed, to the area where the split of air ventilating the working section intersects a main air course, or 2,000 feet outby the section loading point, whichever distance is greater. Other miners shall participate in the escapeway drill by traveling in the primary or alternate escapeway for a distance of 2,000 feet from their working station toward the nearest escape facility or drift opening. An escapeway drill shall not be conducted in the same escapeway as the immediately preceding drill.

(2) At least once every 6 weeks and for each shift, at least two miners on each coal producing working section who work on that section, accompanied by the section supervisor, shall participate in a practice escape drill and shall travel the primary or alternate escapeway from the location specified in paragraph (b)(1) of this section, to the surface, to mechanical escape facilities, or to an underground entrance to a shaft or slope to the surface. Systematic rotation of section personnel shall be used so that all miners participate in this drill. An escapeway drill shall not be conducted in the same escapeway as the immediately preceding drill.

(3) At least once every 6 weeks, at least two miners on each maintenance shift and a supervisor, shall participate in a practice escape drill and shall travel

the primary or alternate escapeway from the location specified in paragraph (b)(1) of this section, to the surface, to mechanical escape facilities, or to an underground entrance to a shaft or slope to the surface. Systematic rotation of maintenance personnel and working sections shall be used so that all miners participate in this drill and the escapeways from all sections are traveled. An escapeway drill shall not be conducted in the same escapeway as the immediately preceding drill.

(4) Before or during practice escapeway drills, miners shall be informed of the locations of fire doors, check curtains, changes in the routes of travel, and plans for diverting smoke from escapeways.

(c) The practice escapeway drills may be used to satisfy the evacuation specifications of the fire drills required by § 75.1101–23.

§ 75.384 Longwall and shortwall travelways.

(a) If longwall or shortwall mining systems are used and the two designated escapeways required by § 75.380 are located on the headgate side of the longwall or shortwall, a travelway shall be provided on the tailgate side of that longwall or shortwall. The travelway shall be located to follow the most direct and safe practical route to a designated escapeway.

(b) The route of travel shall be clearly marked.

(c) When a roof fall or other blockage occurs that prevents travel in the travelway—

(1) Work shall cease on the longwall or shortwall face;

(2) Miners shall be withdrawn from face areas to a safe area outby the section loading point; and

(3) MSHA shall be notified.

Work may resume on the longwall or shortwall face after the procedures set out in §§ 75.215 and 75.222 are implemented.

§ 75.385 Opening new mines.

When new mines are opened, no more than 20 miners at a time shall be allowed in any mine until a connection has been made between the mine openings, and these connections shall be made as soon as possible.

§ 75.386 Final mining of pillars.

When only one mine opening is available due to final mining of pillars, no more than 20 miners at a time shall be allowed in the mine, and the distance between the mine opening and working face shall not exceed 500 feet.

§ 75.388 Boreholes in advance of mining.

(a) Boreholes shall be drilled in each advancing working place when the working place approaches—

(1) To within 50 feet of any area located in the mine as shown by surveys that are certified by a registered engineer or registered surveyor unless the area has been preshift examined;

(2) To within 200 feet of any area located in the mine not shown by surveys that are certified by a registered engineer or registered surveyor unless the area has been preshift examined; or

(3) To within 200 feet of any mine workings of an adjacent mine located in the same coalbed unless the mine workings have been preshift examined.

(b) Boreholes shall be drilled as follows:

(1) Into the working face, parallel to the rib, and within 3 feet of each rib.

(2) Into the working face, parallel to the rib, and at intervals across the face not to exceed 8 feet.

(3) At least 20 feet in depth in advance of the working face, and always maintained to a distance of 10 feet in advance of the working face.

(c) Boreholes shall be drilled in at least one rib of advancing working places described in paragraph (a) of this section. These boreholes shall be drilled—

(1) At an angle of 45 degrees to the direction of advance;

(2) At least 20 feet in depth; and

(3) At intervals not to exceed 8 feet.

(d) When a borehole penetrates an area that cannot be examined, and before mining continues, a certified person shall, if possible, determine—

(1) The direction of airflow in the borehole;

(2) The pressure differential between the penetrated area and the mine workings;

(3) The concentrations of methane, oxygen, carbon monoxide, and carbon dioxide; and

(4) Whether water is impounded within the penetrated area.

(e) Unless action is taken to dewater or to ventilate penetrated areas, boreholes shall be plugged with wooden plugs or similar devices when—

(1) Tests conducted at the boreholes show that the atmosphere in the penetrated area contains more than 1.0 percent methane, less than 19.5 percent oxygen, or harmful concentrations of carbon monoxide, carbon dioxide or other explosive, harmful or noxious gases;

(2) Tests for methane, oxygen, carbon monoxide, and carbon dioxide cannot be made because air from mine workings is flowing into the penetrated area; or

(3) Water is discharging through the boreholes from the penetrated area into the mine workings.

(f) If mining is to be conducted within 50 feet above or below an inaccessible area of another mine, boreholes shall be drilled, as necessary, according to a plan approved by the district manager.

(g) Alternative borehole patterns that provide the same protection to miners as the pattern established by paragraphs (b) and (c) of this section may be used under a plan approved by the district manager.

§ 75.389 Mining into inaccessible areas.

(a)(1) The operator shall develop and follow a plan for mining into areas penetrated by boreholes drilled under § 75.388.

(2) Mining shall not resume into any area penetrated by boreholes until conditions in the penetrated area can be determined under § 75.388 and the plan for mining-through into the area has been approved by the district manager.

(3) A copy of the procedures to be followed shall be posted near the site of the mining-through operations and the operator shall explain these procedures to all miners involved in the operations.

(b) The procedures specified in the plan shall include—

(1) The method of ventilation, ventilation controls, and the air quantities and velocities in the affected working section and working place;

(2) Dewatering procedures to be used if a penetrated area contains a water accumulation; and

(3) The procedures and precautions to be followed during mining-through operations.

(c)(1) Before and during mining-through operations, a certified person shall perform air quality tests at intervals and at locations necessary to protect the safety of the miners;

(2) During mining-through operations, only persons involved in these operations shall be permitted in the mine; and

(3) After mining-through, a certified person shall determine that the affected areas are safe before any persons enter the underground areas of the mine.

Subpart L—Amended

11. Paragraph (e) introductory text of § 75.1103–4 is revised to read as follows:

§ 75.1103–4 Automatic fire sensor and warning device systems; installation; minimum requirements.

* * * * *

(e) Except when power must be cut off in the mine under the provisions of § 75.313, automatic fire sensor and

warning device systems shall be capable of giving warning of fire for a minimum of 4 hours after the source of power to the belt is removed unless the belt haulageway is examined for hot rollers and fire as provided in paragraph (e) (1) or (2) of this section.

* * * * *

12. Paragraph (b) of § 75.1103–7 is revised to read as follows:

§ 75.1103–7 Electrical components; permissibility requirements.

* * * * *

(b) Be provided with protection against ignition of methane or coal dust when the electrical power is deenergized as required by § 75.313, but these components shall be permissible or intrinsically safe if installed in a return airway.

Subpart R—Amended

13. Paragraphs (b)(7) and (b)(8) of § 75.1721 are revised to read as follows:

§ 75.1721 Opening of new underground coal mines, or reopening and reactivating of abandoned or deactivated coal mines, notification by the operator; requirements.

* * * * *

(b) * * *

(6) A proposed roof control plan containing the information specified in § 75.220.

(7) A proposed mine ventilation plan containing the information specified in §§ 75.371 and 75.372;

(8) A proposed plan for sealing worked-out areas containing the information specified in §§ 75.371 and 75.372.

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Subpart S—Amended

* * * * *

§ 75.1801 [Removed]

14. Section 75.1801 is removed.

§ 75.1802 [Removed]

15. Section 75.1802 is removed.

§ 75.1803 [Removed]

16. Section 75.1803 is removed.

§ 75.1804 [Removed]

17. Section 75.1804 is removed.

§ 75.1805 [Removed]

18. Section 75.1805 is removed.

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